This document is based on European standards and is not valid for use in U.S.A.

Compact / Hardwired / Logic Controller / M258
System User Guide

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Schneider Electric

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Important Information

NOTICE Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result in** death, serious injury, or equipment damage.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result in** injury or equipment damage.

PLEASE NOTE Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved

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Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to **the operator of that machine.**

⚠ WARNING
UNGUARDED MACHINERY CAN CAUSE SERIOUS INJURY • Do not use this software and related automation products on equipment which does not have point-of-operation protection. • Do not reach into machine during operation. **Failure to follow these instructions can cause death, serious injury or equipment damage.**

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only the user can be aware of all the conditions and factors present during setup, operation and maintenance of the machine; therefore, only the user can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, the user should refer to the applicable local and national standards and regulations. A "National Safety Council's" Accident Prevention Manual also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products by itself cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks for point-of-operation protection have been installed and are operational before placing the equipment into service. All mechanical/electrical interlocks and safeties for point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of this document.

START UP AND TEST

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

⚠ CAUTION

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start up tests recommended in the equipment documentation. Store all equipment documentation for future reference.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and rating of components, there are hazards that can be encountered if such equipment is improperly operated.

- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.

- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

⚠ WARNING

UNEXPECTED EQUIPMENT OPERATION

- Only use software tools approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can cause death, serious injury or equipment damage.

Introduction

Intention

This document is intended to provide a quick introduction to the described system. It is not intended to replace any specific product documentation, nor any of your own design documentation. On the contrary, it offers additional information to the product documentation, for installing, configuring and implementing the system.

The architecture described in this document is not a specific product in the normal commercial sense. It describes an example of how Schneider Electric and third-party components may be integrated to fulfill an industrial application.

A detailed functional description or the specification for a specific user application is not part of this document. Nevertheless, the document outlines some typical applications where the system might be implemented.

The architecture described in this document has been fully tested in our laboratories using all the specific references you will find in the component list near the end of this document. Of course, your specific application requirements may be different and will require additional and/or different components. In this case, you will have to adapt the information provided in this document to your particular needs. To do so, you will need to consult the specific product documentation of the components that you are substituting in this architecture. Pay particular attention in conforming to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

It should be noted that there are some major components in the architecture described in this document that cannot be substituted without completely invalidating the architecture, descriptions, instructions, wiring diagrams and compatibility between the various software and hardware components specified herein. You must be aware of the consequences of component substitution in the architecture described in this document as substitutions may impair the compatibility and interoperability of software and hardware.

⚠ CAUTION

EQUIPMENT INCOMPATIBILITY OR INOPERABLE EQUIPMENT

Read and thoroughly understand all hardware and software documentation before attempting any component substitutions.

Failure to follow these instructions can result in injury or equipment damage.

Abbreviations

Abbreviation	Signification
AC	Alternating Current
CB	Circuit Breaker
CFC	Continuous Function Chart – a programming language based on function chart
DI	Digital Input
DO	Digital Output
DC	Direct Current
DFB	Derived Function Blocks
E-STOP	Emergency Stop
FBD	Function Block Diagram – an IEC-61131 programming language
HMI	Human Machine Interface
I/O	Input/Output
IL	Instruction List - a textual IEC-61131 programming language
LD	Ladder Diagram – a graphic IEC-61131 programming language
PC	Personal Computer
POU	Programmable Object Unit, Program Section in SoMachine
PS	Power Supply
RMS	Root Mean Square
RPM	Revolutions Per Minute
SE	Schneider Electric
SFC	Sequential Function Chart – an IEC-61131 programming language
ST	Structured Text – an IEC-61131 programming language
TVDA	Tested, Validated and Documented Architecture
VSD	Variable Speed Drive
WxHxD	Dimensions : Width, Height and Depth

Glossary

Expression	Signification
Altivar (ATV)	SE product name for a family of VSDs
Harmony	SE product name for a family of switches and indicators
Lexium (LXM)	SE product name for a family of servo drives
Magelis	SE product name for a family of HMI-Devices
Modicon M258 Logic controller	SE product name for Logic Controller
Modbus	A Communications protocol
OsiSense	SE product name for a family of sensors
Phaseo	SE product name for a family of power supplies
Preventa	SE product name for a family of safety devices
SoMachine	SE product name for an integrated software tool
TeSys	SE product name for a family for motor protection devices and load contactors
Vijeo Designer	An SE software product for programming Magelis HMI devices

Application Source Code

Introduction

Examples of the source code and wiring diagrams used to attain the system function as described in this document can be downloaded from our website (registration is required, contact your Schneider Electric Application Design Expert).

The example source code is in the form of configuration, application and import files. Use the appropriate software tool to either open or import the files.

Extension	File Type	Software Tool Required
CSV	Comma Separated Values, Spreadsheet	MS Excel
DWG	Project file	AutoCAD
DOC	Document file	Microsoft Word
PDF	Portable Document Format - document	Adobe Acrobat
PROJECT	Project file	SoMachine
Z13	Project archive file	EPLAN

Typical Applications

Introduction

Here you will find a list of the typical applications, and their market segments, where this system or subsystem can be applied:

Hoisting

- Gantry crane
- Overhead traveling crane

Textile

- Opening and closing machines
- Circular knitting machines
- Plucker machines
- Blending machines
- Carding machines
- Drawing frame machines
- Combing machines
- Ring Spinning machines

Pumping

- Booster stations
- Compressors
- Vacuum pumps

Other Machines

- Winding / Unwinding machines
- Wood working machines
- Cutting machines
- Sanding machines
- Sawing machines

System

Introduction

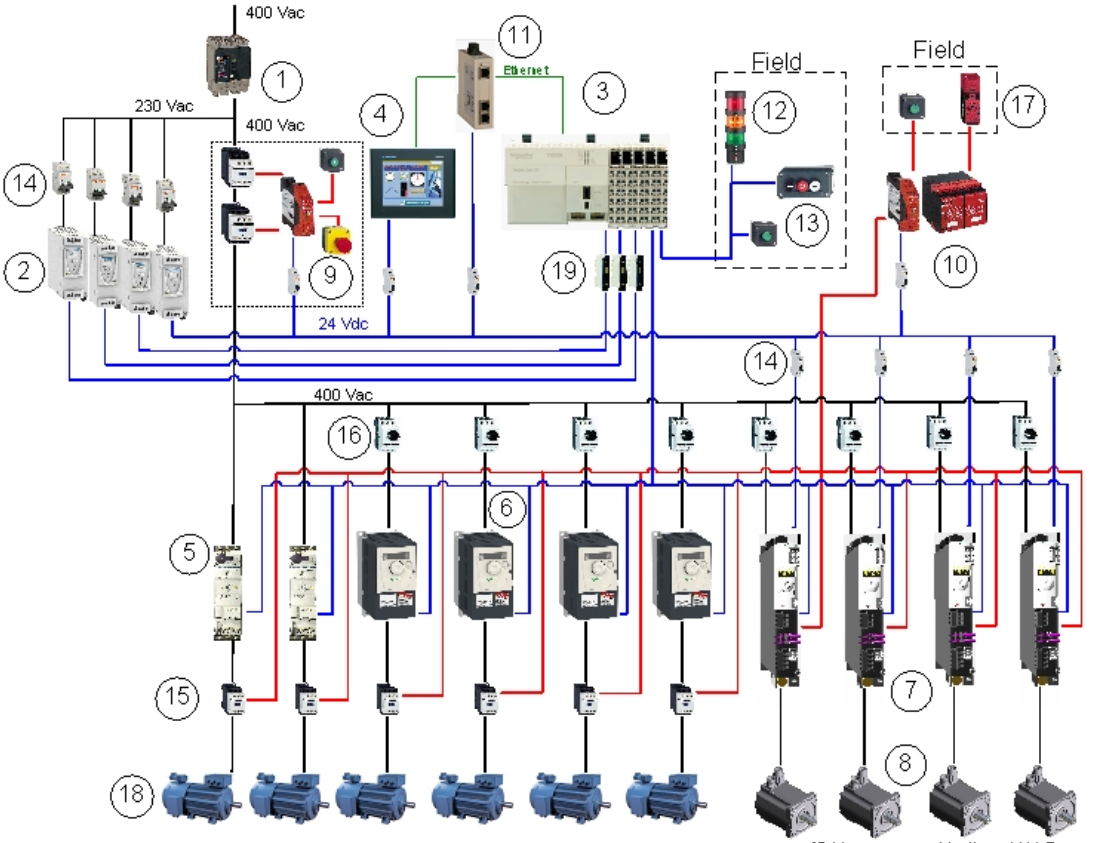
The system chapter describes the architecture, the dimensions, the quantities and different types of components used within this system.

Architecture

General

The controller in this application is a Modicon M258 Logic controller. The user can control and monitor the application using the Magelis HMI device. The Altivar 312 variable speed drives, Lexium 32C servo drives and TeSysU motor starters are hardwired to the controller. The example application includes two functional safety options according to EN ISO 13849-1 standards: an Emergency Stop function supervised by a Preventa Safety Module (see the appropriate hardware manual), plus a second Preventa Safety Module to evaluate protective door sensors.

Layout



1. Compact NSX main switch
2. Phaseo power supply ABL8
3. Modicon M258 Logic controller
4. Magelis XBTGT HMI
5. TesysU motor starter LU
6. Altivar 312 variable speed drive ATV312
7. Lexium 32C servo drive LXM32C
8. Lexium servo motor BMH
9. Harmony Emergency Stop XALK
10. Preventa safety module XPS
11. Ethernet switch ConneXium
12. Harmony tower light XVBC
13. Harmony pushbuttons XALD
14. Multi9 circuit breaker
15. TeSysD contactor LC1D
16. TeSys motor circuit breaker GV2L
17. Preventa guard switch XCS
18. Standard AC-motor
19. Slow blow fuse

Components

Hardware:

- Compact NSX100F mains switch
- Phaseo ABL8 Power Supply 230 Vac / 24 Vdc
- Modicon M258 Logic controller
- Magelis XBTGT4330 HMI
- TeSysU motor starter
- Altivar 312 variable speed drive
- Lexium 32C servo drive
- BMH servo motor
- Multi9 circuit breaker
- Emergency Stop switch with rotation release XALK
- Harmony illuminated pushbuttons XB5
- OsiSense limit switches
- Preventa guard switch
- Preventa safety module
- TeSys motor protection GV2L
- TeSysD contactors
- Connexium Ethernet switch

Software:

- SoMachine V2.0

Quantities of Components

For a complete and detailed list of components, the quantities required and the order numbers, please refer to the components list at the rear of this document.

Degree of Protection

Not all the components in this configuration are designed to withstand the same environmental conditions. Some components may need additional protection, such as housings, depending on the environment in which you intend to use them. For environmental details of the individual components please refer to the list in the appendix of this document and the corresponding user manual.

Cabinet Technical Data

Input	Mains voltage	400 Vac
	Power requirement	~ 4 kW
	Cable size	5 x 2.5 mm² (L1, L2, L3, N, PE)
	Cable connection	3 phase + Neutral + Ground Neutral is needed for 230 Vac (Phase and Neutral)
Output	Motor power ratings	2 asynchronous motor controlled by TesysU (0.37 kW) 4 asynchronous motor controlled by ATV312 (0.37 kW) 4 servo motor (BMH type without brake) controlled by LXM32C (continuous output current : 6 A RMS at 6000 RPM)

Functional Safety Notice

(EN ISO 13849-1 EN IEC 62061)

The standard and level of functional safety you apply to your application is determined by your system design and the overall extent to which your system may be a hazard to people and machinery.

As there are no moving mechanical parts in this application example, category 1 (according to EN ISO 13849-1) has been selected as an optional safety level.

Whether or not this functional safety category should be applied to your system should be ascertained with a proper risk analysis.

This document is not comprehensive for any systems using the given architecture and does not absolve users of their duty to uphold the functional safety requirements with respect to the equipment used in their systems or of compliance with either national or international safety laws and regulations.

Emergency Stop

Emergency Stop/Emergency Disconnection function

This function for stopping in an emergency is a protective measure which compliments the safety functions for the safeguarding of hazardous zones according to prEN ISO 12100-2.

Safety Function

Door guarding

up to Performance Level (PL) = b, Category 1, Safety Integrity Level (SIL) = 1

Dimensions

The dimensions of the individual devices used; controller, drive, power supply, etc. require a housing cabinet size of at least 1800 x 1000 x 600 mm (WxHxD).

The HMI display, illuminated indicators such as “SYSTEM ON“, “SYSTEM OFF“ or “ACKNOWLEDGE EMERGENCY OFF“ as well as the Emergency Stop switch itself, can be built into the door of the cabinet.

Installation

Introduction

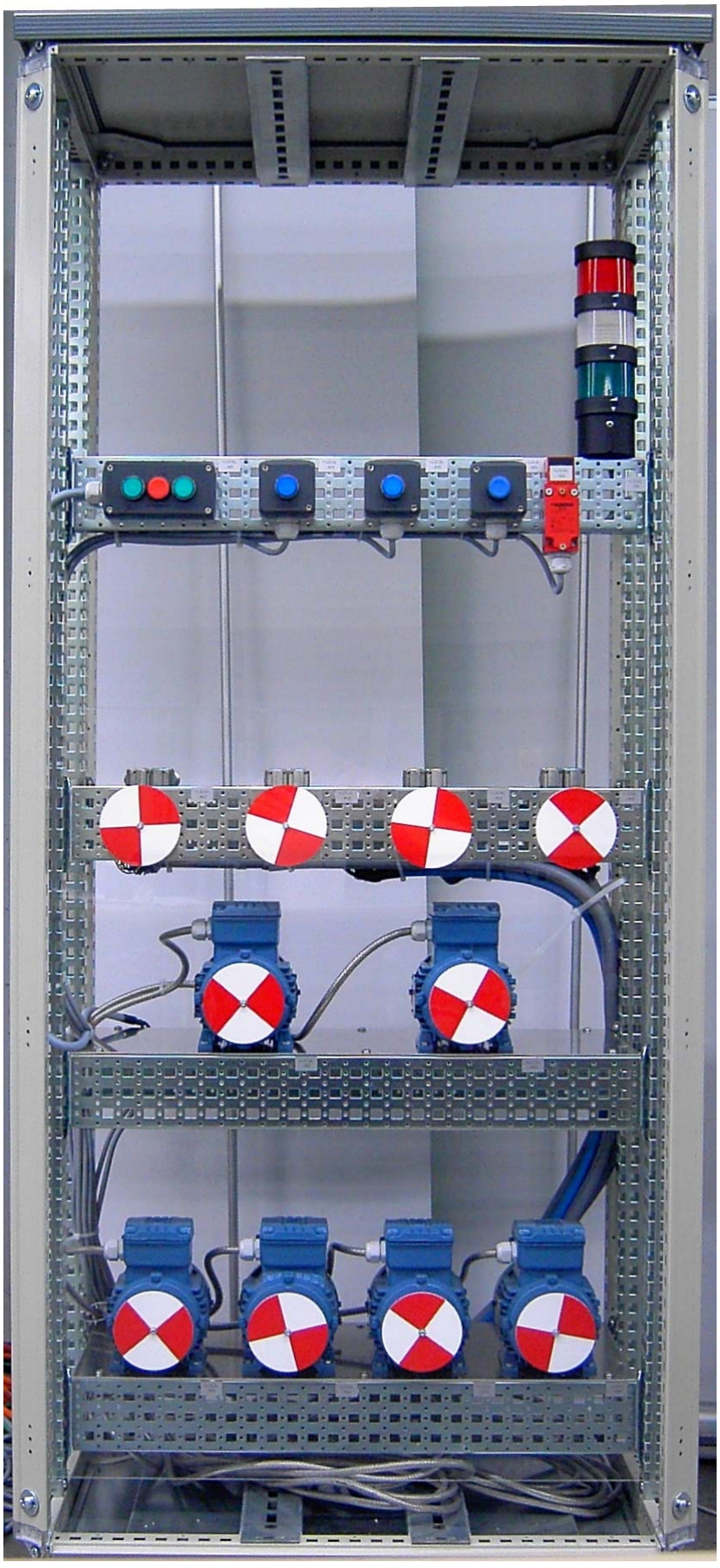
This chapter describes the steps necessary to set up the hardware and configure the software required to fulfill the described function of the application.

Assembly

Main cabinet

Front

Field devices and motors



Notes

The components designed for installation in a cabinet, i.e. the controller, safety module, circuit breakers, contactors, motor circuit breakers, power supply, TeSysU motor starter and TM5 I/O modules can be mounted on a 35 mm DIN rail.

Main switch, Lexium 32C servo drives and Altivar 312 variable speed drives are screwed directly onto the mounting plate. Alternatively, if an adapter is used, the Altivar 312 can be mounted on a DIN rail.

The Emergency Stop button, the door guard switches and the pushbutton housing for the display and acknowledgement indicators are designed for on-wall mounting in the field. All switches (except the door guard switch) can also be installed directly inside a control cabinet (e.g., in a cabinet door) without special housings.

There are two options for installing XB5 pushbuttons or indicator lamps: These pushbuttons or switches can be installed either in a 22 mm hole, e.g., drilled into the front door of the control cabinet, or in an XALD-type housing suitable for up to 5 pushbuttons or indicator lamps. The XALD pushbutton housing is designed for backplane assembly or direct wall mounting.

400 Vac 3-phase wiring between the main circuit breaker, drives and motors.

230 Vac 1-phase wiring between the main circuit breaker and Lexium 32C drive.

230 Vac 1-phase wiring between the main circuit breaker and primary side of the 24 Vdc power supply.

24 Vdc wiring for control circuits and the controller, I/O modules and the HMI power supply.

The individual components must be interconnected in accordance with the detailed circuit diagram in order to ensure that they function correctly.

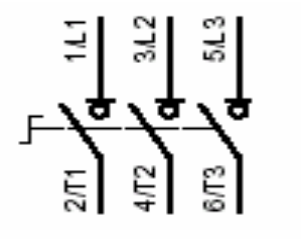
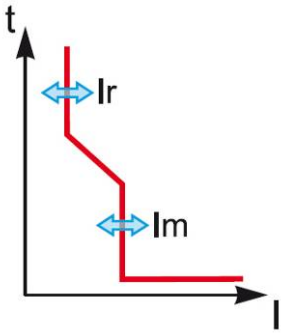
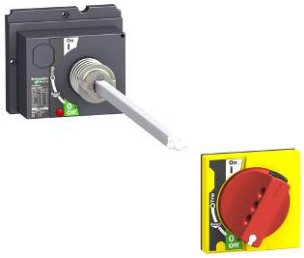
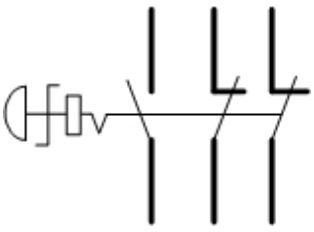
ConneXium Ethernet 3 port switch TCSESU033FN0 and ConneXium Ethernet cable 490NTW00002 is installed for the communication link between the controller and the HMI.

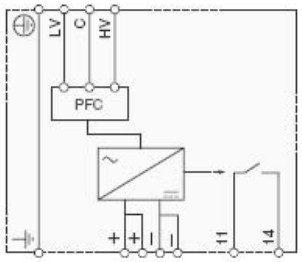
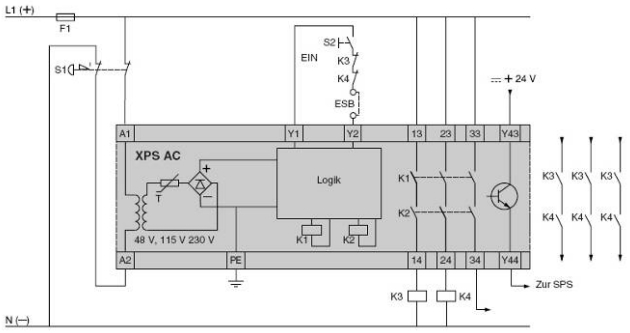
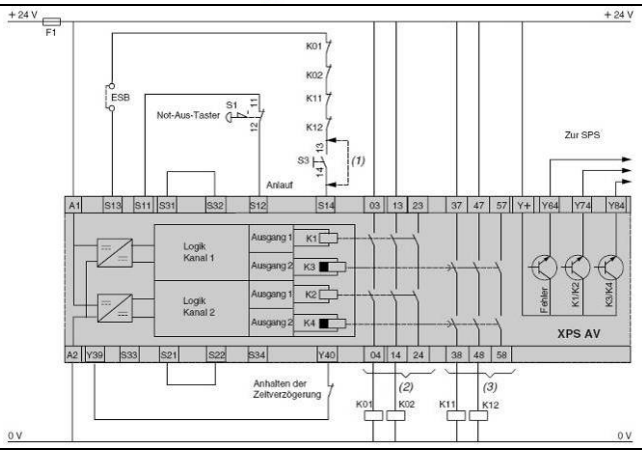
The modules and I/O listed here are a representative cross section of the modules and indicators required to implement the application as defined in this document and will without doubt differ from your own specific application.

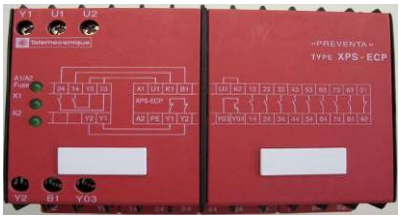
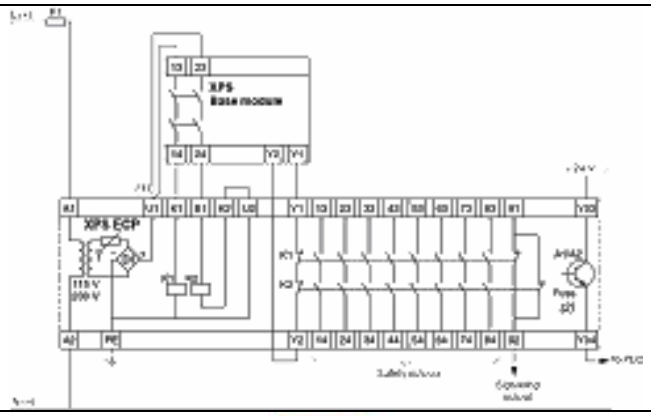
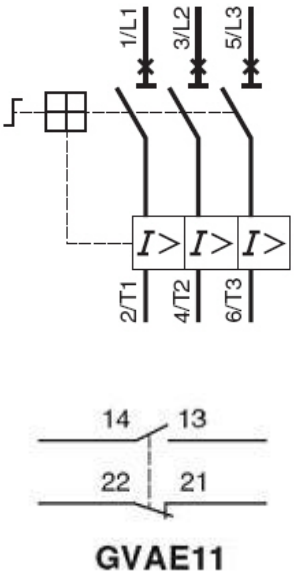
Hardware

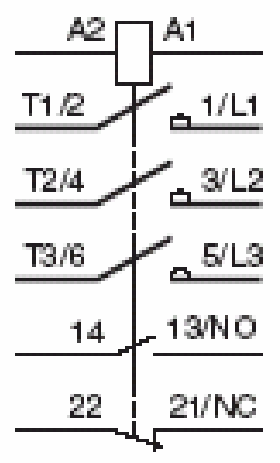
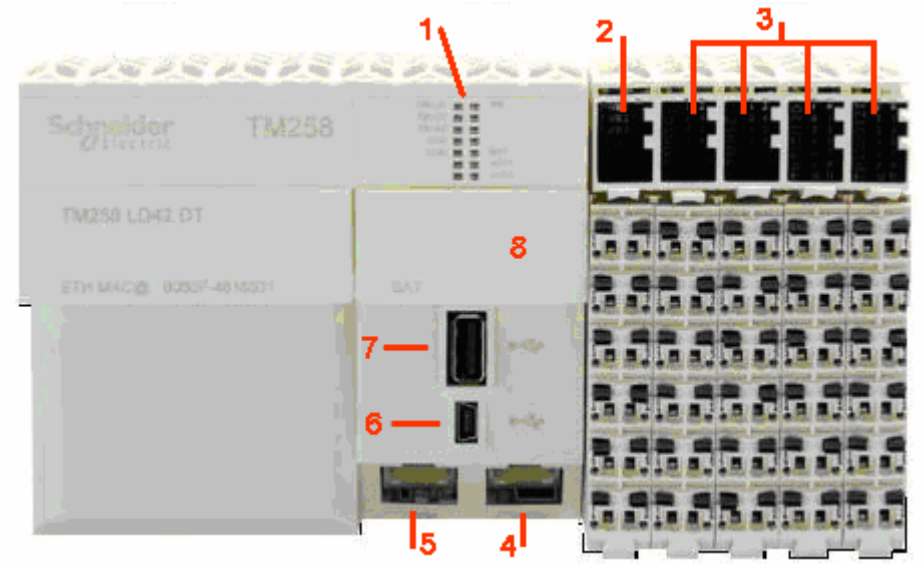
General

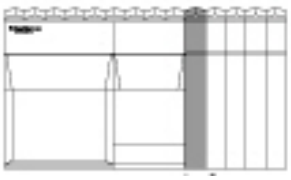
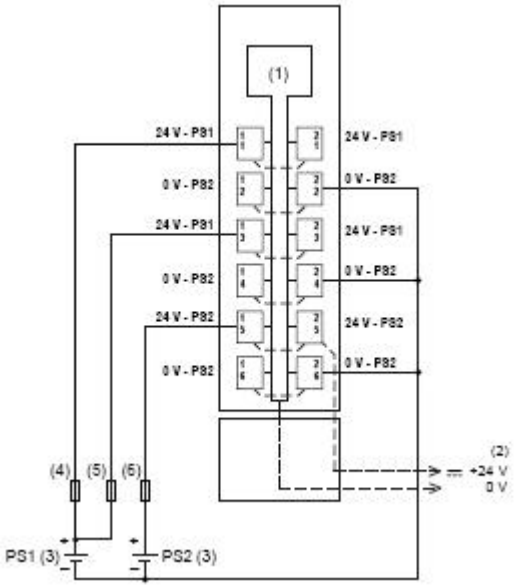
General description of the hardware.

Main Switch **Compact NSX100F** **LV429003** 36 kA 380/415 Vac		
Main Switch **Compact NSX100F** **LV429035** Trip unit TM32D Thermal-magnetic 32 A		 Ir - Thermal protection Im - Magnetic protection
Main Switch **Compact NSX100F** **Rotary handle** **LV429340** **Terminal shield** **LV429515**	 Rotary handle with red handle on yellow front	 Terminal shield short
Emergency Stop switch for door mounting **Harmony** **XB5AS844 +** **XB5AZ141** Incl. Emergency Stop Label **ZBY8330**		

Power supply **Phaseo** **ABL8RPS24050** 24 Vdc, 5 A		
Safety Module **Preventa** **XPSAC5121**	 	
Safety Module **Preventa** **XPSAV11113Z002**	 	

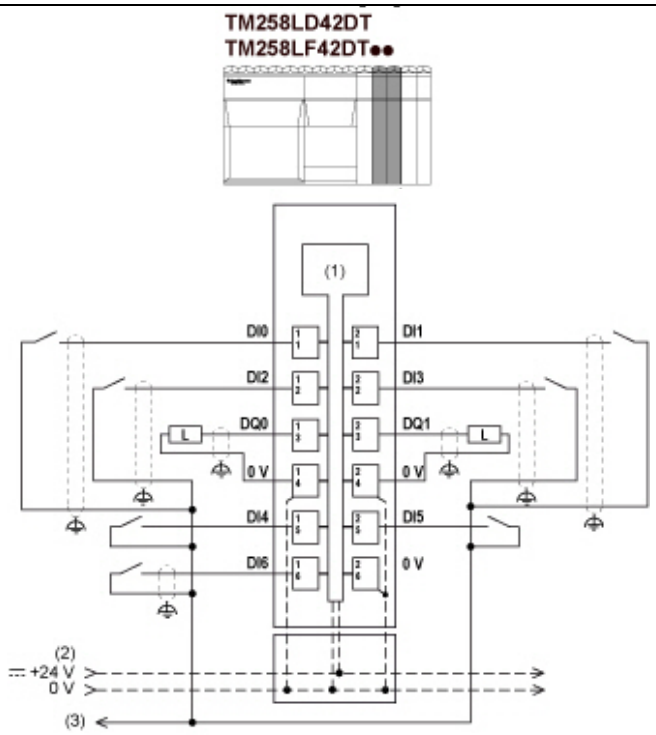
Expansion Module **Preventa** **XPSECP5131**	 	
Guard Switch **Preventa** **XCSPA792**		
Motor Circuit Breaker (Short Circuit Protected) **GV2L07** **and** **GV2L14** Used together with auxiliary contact **GVAE11**		

Contactor **TeSysD** **LC1D09BD**		
Controller **Modicon M258 Logic Controller** **TM258LD42DT**	1. Status LEDs 2. Power supply 3. Internal I/O area 4. Ethernet port 5. RS485 port 6. Mini USB port 7. USB A port 8. Battery area	
		

Modicon M258 Logic Controller embedded power supply	**TM258LD42DT** **TM258LF42DT●●**   1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases 3. PS1/PS2: External isolated power supply 24 Vdc limited to 200 VA for UL508 conformance, or limited to 150 VA for CSA 22.2, N° 142 conformance 4. External fuse type T slow-blow 3 A 250 V 5. External fuse type T slow-blow 1 A 250 V 6. External fuse type T slow-blow 6.3 A 250 V

Modicon M258
Logic Controller

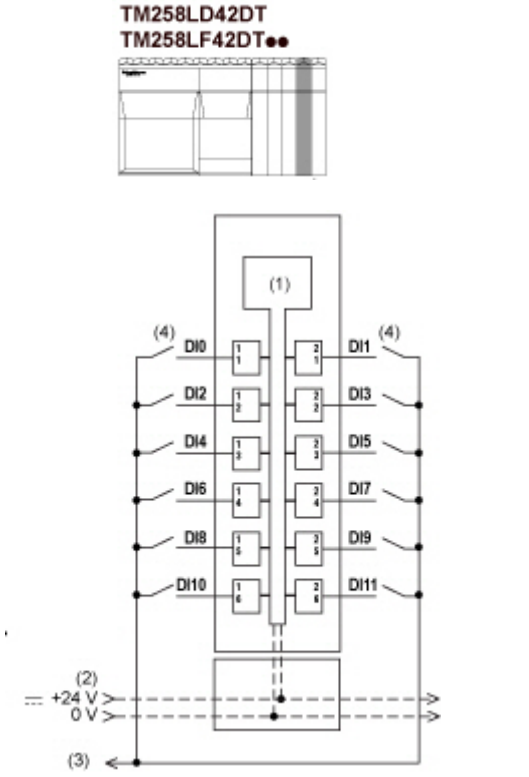
embedded fast I/O's



1 Internal electronics
2 24 Vdc I/O power segment integrated into the bus bases
3 24 Vdc Embedded expert modules power by external connection

Modicon M258
Logic Controller

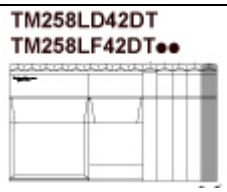
embedded
digital inputs

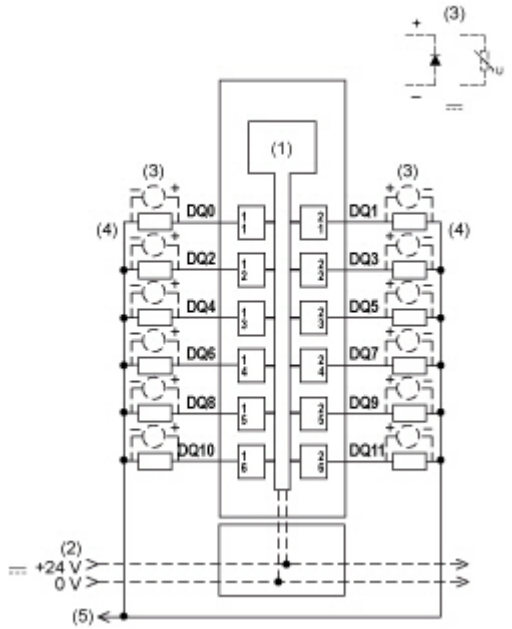


1 Internal electronics
2 24 Vdc I/O power segment integrated into the bus bases
3 24 Vdc I/O power segment by external connection
4 2-wire sensor

Modicon M258
Logic Controller

embedded
digital outputs



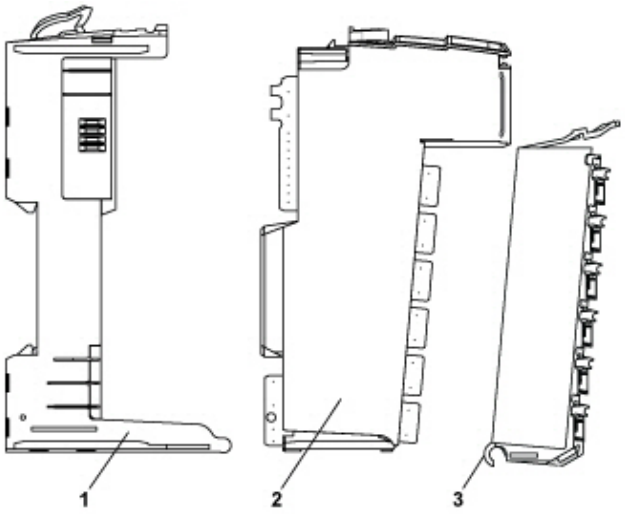


1	Internal electronics
2	24 Vdc I/O power segment integrated into the bus bases
3	Inductive load protection
4	2-wire load
5	0 Vdc I/O power segment by external connection

Modicon M258
Logic Controller

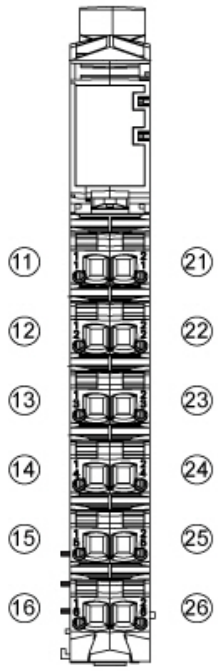
Expansion module

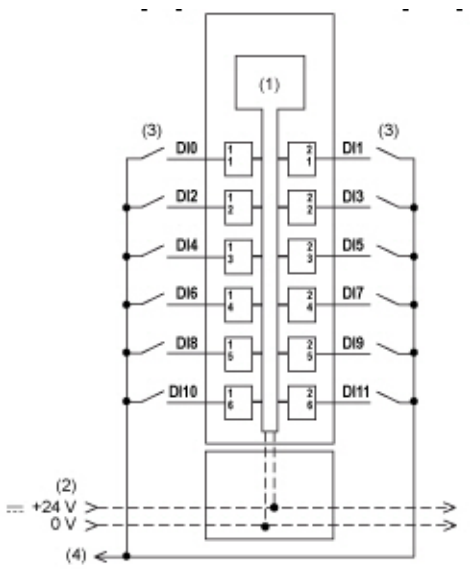
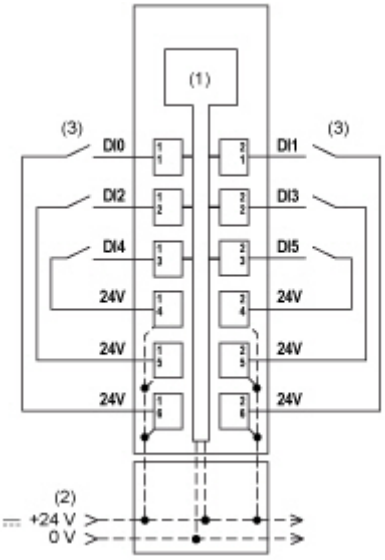
elements

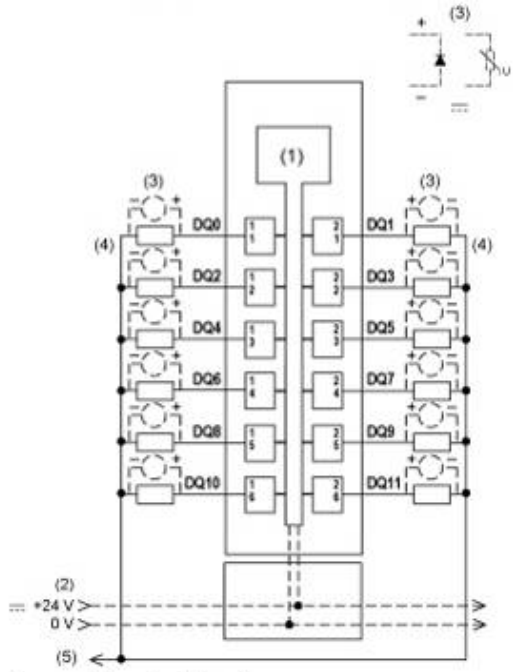
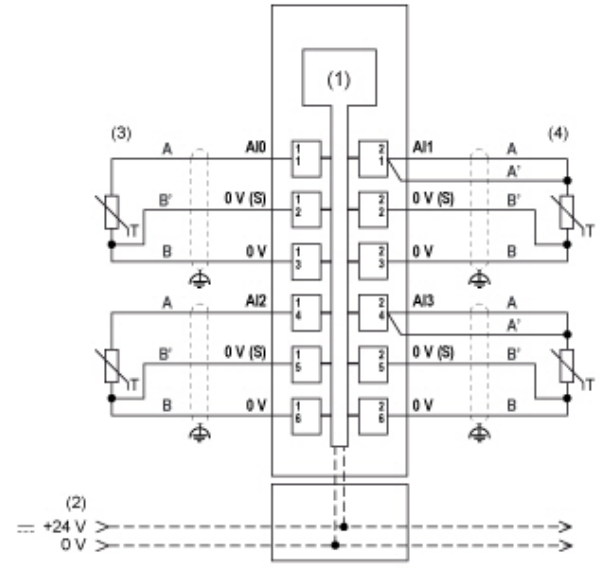


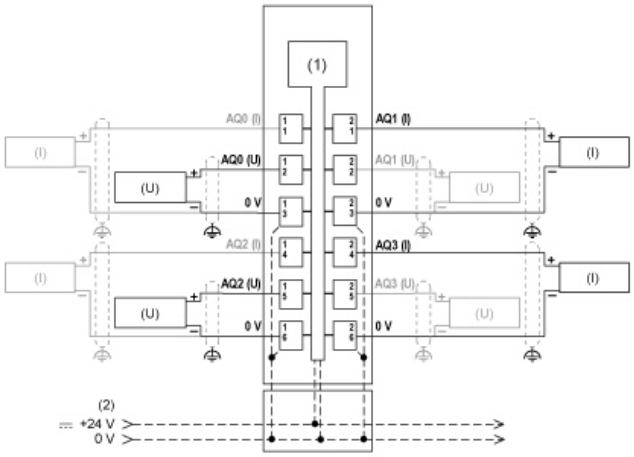
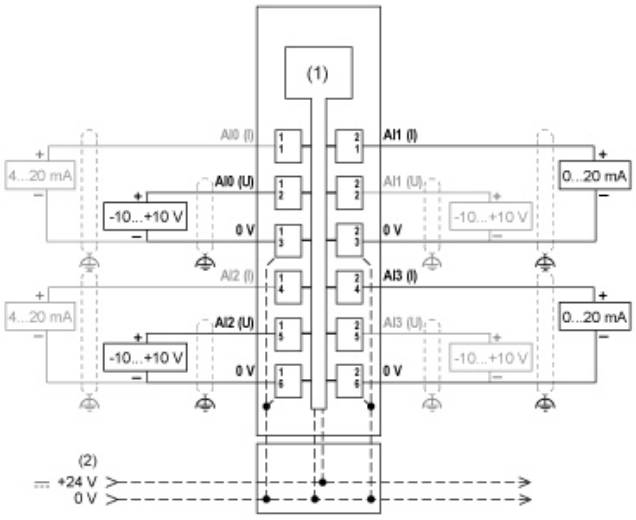
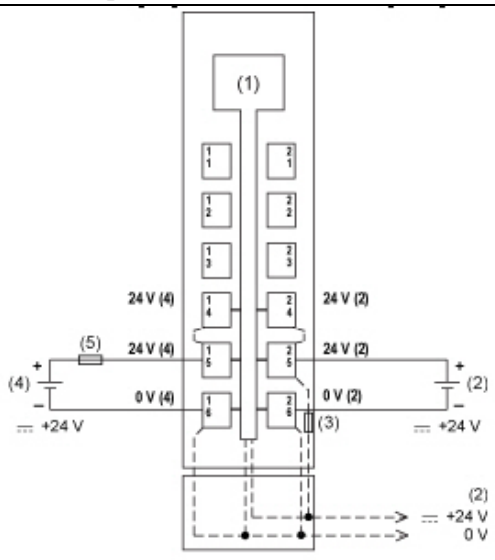
1. Bus base
2. Electronic module
3. Terminal block

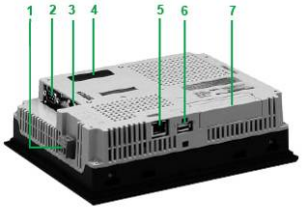
Modicon M258 **Logic Controller** **Bus base for** **electronic module** **TM5ACBM11** and for additional power supply **TM5ACBM01R** left side isolated	
Modicon M258 **Logic Controller** **Electronic module**	

Modicon M258 **Logic Controller** **Terminal block** **TM5ACTB12**		 pin assignment
Modicon M258 **Logic Controller** **Bus Base Locking** Plate Right **TM5ACLPR1**	 	

Modicon M258 Logic Controller **Expansion module** **TM5SDI12D** with 12 digital inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** 2 wire-sensor **4** 24 Vdc I/O power segment by external connection
Modicon M258 Logic Controller **Expansion module** **TM5SDI6D** with 6 digital inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** 2-wire sensor

Modicon M258 Logic Controller **Expansion module** **TM5SDO12T** with 12 digital outputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** Inductive load protection **4** 1-wire load **5** 0 Vdc I/O power segment by external connection
Modicon M258 Logic Controller **Expansion module** **TM5SAI4PH** with 4 Pt100 inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** 3-wire sensor **4** 4-wire sensor

Modicon M258 Logic Controller **Expansion module** **TM5SAO4L** with 4 analog outputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **I** Current **U** Voltage
Modicon M258 Logic Controller **Expansion module** **TM5SAI4L** with 4 analog inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **I** Current **U** Voltage
Modicon M258 Logic Controller **Expansion module** **TM5SPS2F** **power supply**	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** Integrated fuse type T slow-blow 6.3 A 250 V exchangeable **4** 24 Vdc Main power **5** External fuse type T slow-blow 2 A 250 V

HMI **Magelis** **XBTGT4330** 24 Vdc Input, TFT Color LCD, 640 x 480 Pixels, 65536 Colors, 32 MB Application Flash EPROM with Built-in Ethernet	
 	1 A removable screw terminal block for the 24 V ⎓ power supply 2 A 9-way male SUB-D connector for RS 232C or RS 422/485 serial link to PLCs (COM1) 3 An RJ45 connector for RS 485 serial link (COM2) with switch for polarization of the link used on Modbus 4 An expansion unit interface for fieldbus communication card (Device Net, Profibus DP) *(1)* 5 An RJ45 connector for Ethernet TCP/IP link, 10BASE-T/100BASE-TX, with an activity LED 6 A USB type A host connector for connecting peripherals, transferring applications and Modicon M340 terminal port communication 7 A slot for Compact Flash memory card, with pivoting cover 8 A removable I/O connector, 12 spring terminals for loudspeaker connection, one input (reset) and 3 outputs (alarm, buzzer, run). **On XBT GT4340 only:** 9 A mini-jack connector for connecting a microphone 10 An RCA connector for connecting a digital or analog video camera (NTSC/PAL)
Servo Drive **Lexium 32C** **LXM32CD18M2** 1-phase 230 Vac, Continuous output current : 6 A RMS at 6000 RPM	

Servo Drive

Lexium 32C

LXM32CD18M2

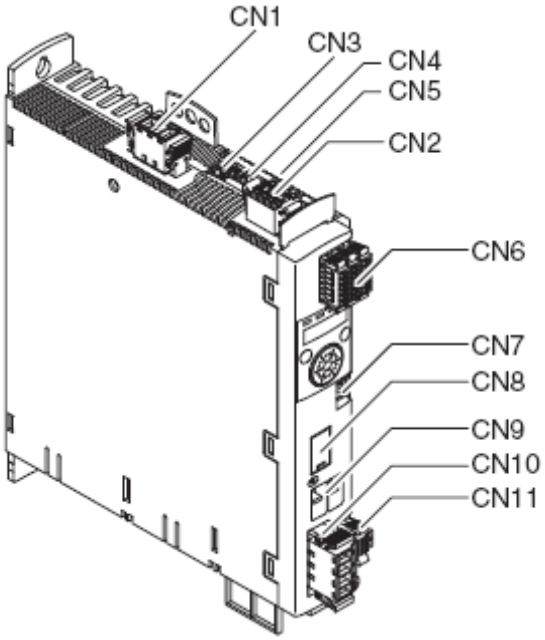
Embedded Human Machine Interface

Servo Drive

Lexium 32C

LXM32CD18M2

Control Panel Overview of the Signal Connectors



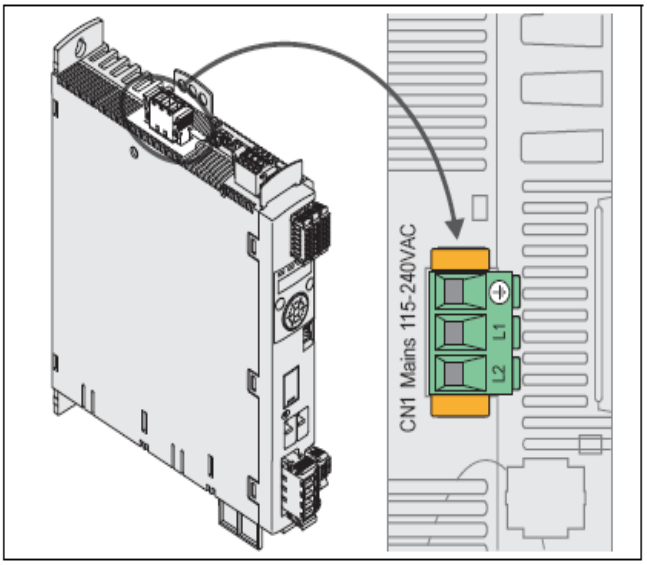
Connection	Assignment
CN1	Power stage supply voltage
CN2	24 controller supply voltage and STO safety function
CN3	Motor encoder (encoder 1)
CN4	PTO (encoder simulation ESIM)
CN5	PTI (pulse/direction, A/B, CW/CCW)
CN6	Analog inputs and digital inputs/outputs
CN7	Modbus (commissioning interface)
CN8	External braking resistor
CN9	DC bus connection for parallel operation
CN10	Motor phases
CN11	Holding brake

Servo Drive

Lexium 32C

LXM32CD18M2

Power Connection CN1



Servo Drive

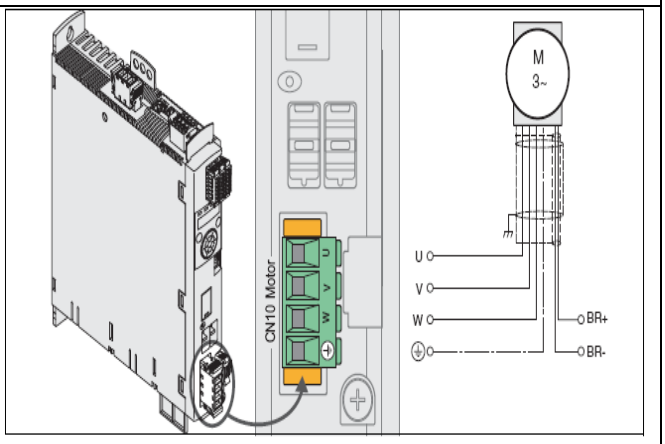
Lexium 32C

LXM32CD18M2

Motor Connection CN10

Power Cable Connection to Motor (Length 3 m)

VW3M5101R30



Connection	Meaning	Color
U	Motor phase	Black L1 (BK)
V	Motor phase	Black L2 (BK)
W	Motor phase	Black L3 (BK)
PE	Protective ground conductor	Green/yellow (GN/YE)
BR+	Holding brake +	White (WH)
BR-	Holding brake -	Gray (GR)

Servo Drive

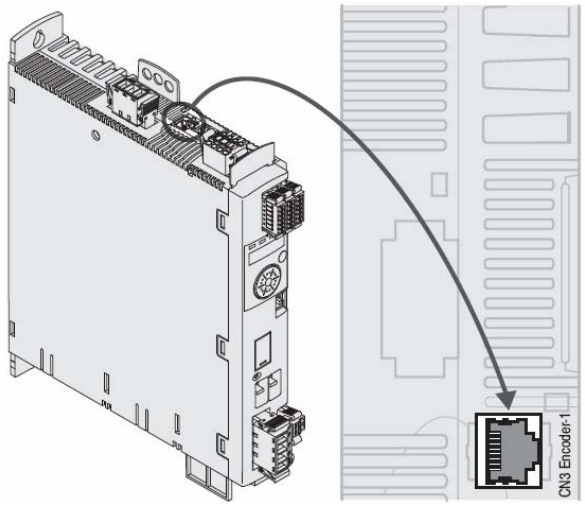
Lexium 32C

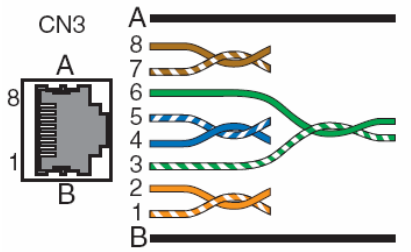
LXM32CD18M2

Signal Connector
CN3

Encoder Cable
Connection to Motor
(Length 3 m)

VW3M8101R30





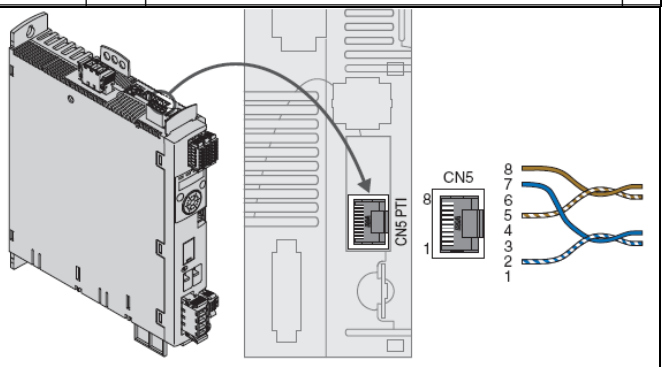
Pin	Signal	Motor, pin	Pair	Meaning	I/O
1	COS+	9	2	Cosine signal	I
2	REFCOS	5	2	Reference for cosine signal	I
3	SIN+	8	3	Sine signal	I
6	REFSIN	4	3	Reference for sine signal	I
4	Data	6	1	Receive data, transmit data	I/O
5	$\overline{\text{Data}}$	7	1	Receive data and transmit data, inverted	I/O
7	reserved		4	Not assigned	
8	reserved		4	Not assigned	
A	ENC+10V_OUT	10	5	Encoder supply	O
B	ENC_0V	11	5	Reference potential for encoder supply	
	SHLD			Shield	

Servo Drive

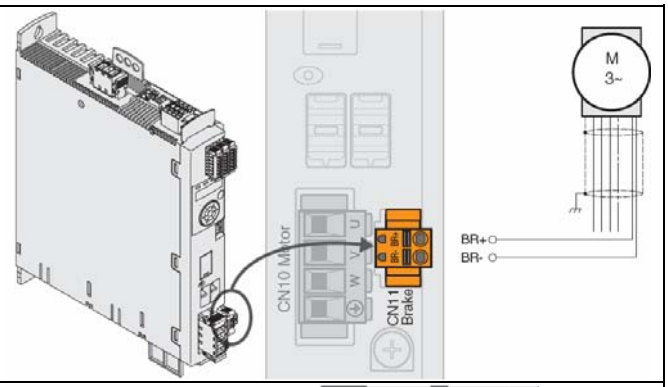
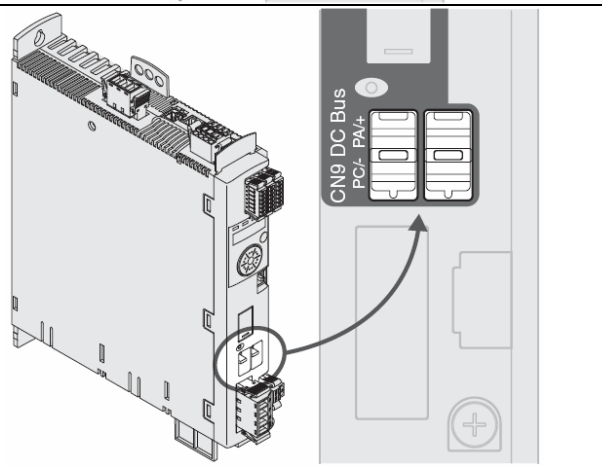
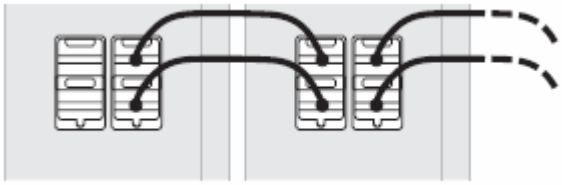
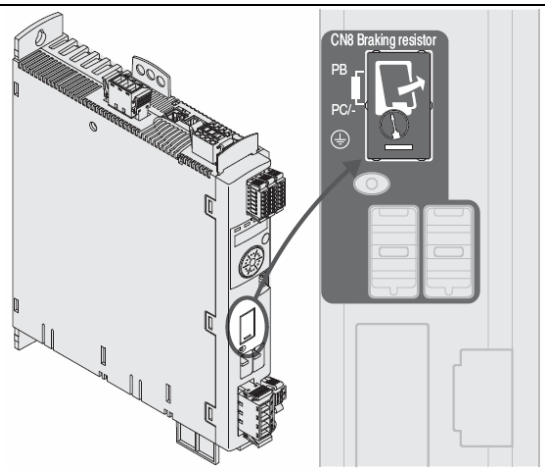
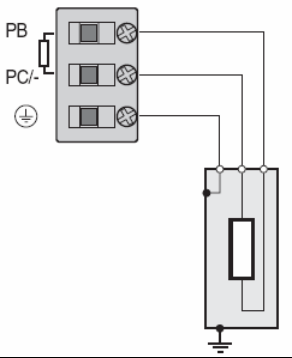
Lexium 32C

LXM32CD18M2

Signal Connector
CN5



Pin	Signal	Pair	Meaning	I/O
7	PULSE(24)	A	Pulse 24V	I (24 V)
2	$\overline{\text{PULSE}}$	A	Pulse, inverted	I (24 V)
8	DIR(24)	B	Direction 24V	I (24 V)
5	$\overline{\text{DIR}}$	B	Direction, inverted	I (24 V)

Servo Drive **Lexium 32C** **LXM32CD18M2** Wiring diagram holding brake	
Servo Drive **Lexium 32C** **LXM32CD18M2** Parallel connection DC bus	 
Servo Drive **Lexium 32C** **LXM32CD18M2** Connecting the external braking resistor	 

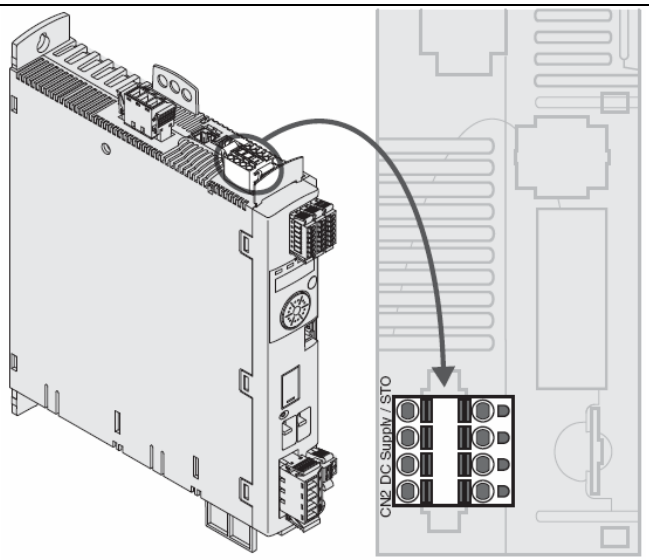
Servo Drive

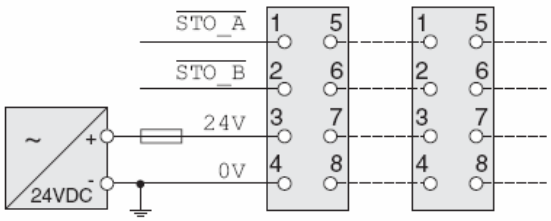
Lexium 32C

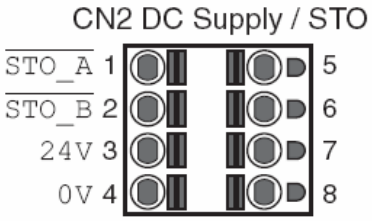
LXM32CD18M2

Wiring diagram controller supply voltage and STO CN2

The controller supply voltage (24 Vdc) must be connected for all operating modes







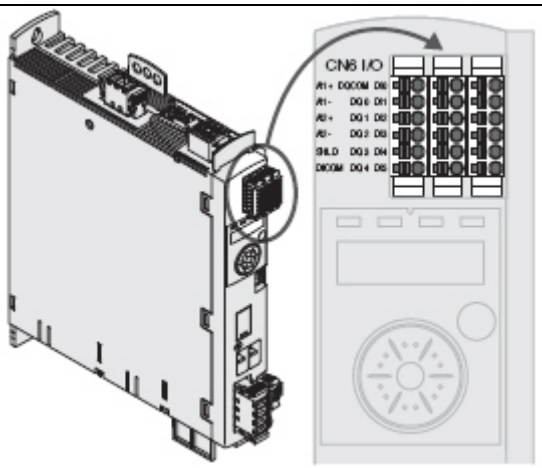
Pin	Signal	Meaning
1, 5	STO_A	Safety function STO: Dual-channel connection, connection A
2, 6	STO_B	Safety function STO: Dual-channel connection, connection B
3, 7	+24VDC	24 V controller supply voltage
4, 8	0VDC	Reference potential for 24 V controller supply voltage; Reference potential for STO

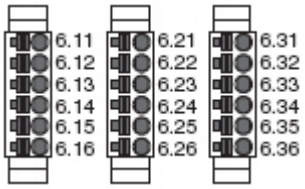
Servo Drive

Lexium 32C

LXM32CD18M2

Wiring diagram, digital inputs/outputs





Pin	Signal	1)	Meaning
6.11	AI1+		Analog input 1, ±10V, for example, for reference value current or reference value speed of rotation
6.12	AI1-		Reference potential to AI1+, pin 1
6.13	AI2+		Analog input 2, ±10V, for example for current limitation or speed limitation
6.14	AI2-		Reference potential to AI2+, pin 3
6.15	SHLD		Shield connection
6.16	DI_COM	X	Reference potential to DI0 ... DI5 at CN6.31 ... CN6.36

Pin	Signal	1)	Meaning
CN6.21	DQ_COM		Reference potential digital outputs
CN6.22	DQ0		Digital output 0
CN6.23	DQ1		Digital output 1
CN6.24	DQ2		Digital output 2
CN6.25	DQ3	X	Digital output 3
CN6.26	DQ4		Digital output 4

Pin	Signal	1)	Meaning
CN6.31	DI0		Digital input 0
CN6.32	DI1		Digital input 1
CN6.33	DI2		Digital input 2
CN6.34	DI3	X	Digital input 3
CN6.35	DI4		Digital input 4
CN6.36	DI5		Digital input 5

Pin	Signal		Meaning
	DI_COM		Reference potential digital inputs: CN6.14

Servo motor

BMH0702T06A2A

Connected to Motor Terminals and CN3 of LXM32 using cables VW3M5101R30 and VW3M8101R30 respectively

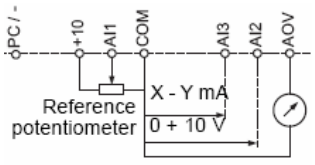
Variable Speed Drive

Altivar 312

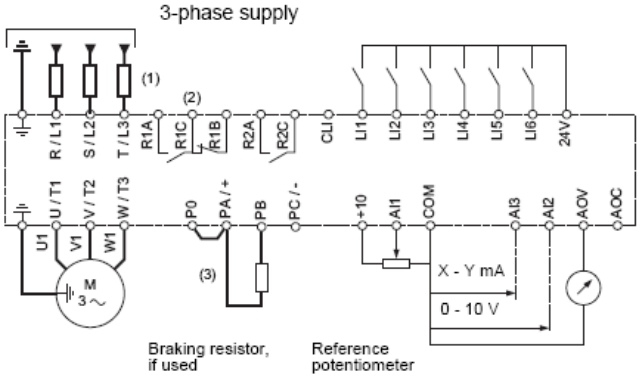
ATV312H037N4

3-phase

400 Vac, 0.37 kW



External 0…10 Vdc Analog Signal as Speed Reference



(1) Line choke, if used
(2) Detected fault relay contacts, for remote indication of the drive status
(3) Braking resistor, if used

Variable Speed Drive

Altivar 312

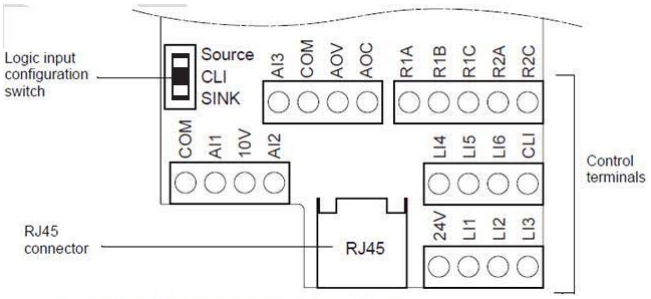
ATV312H037N4

Terminal board

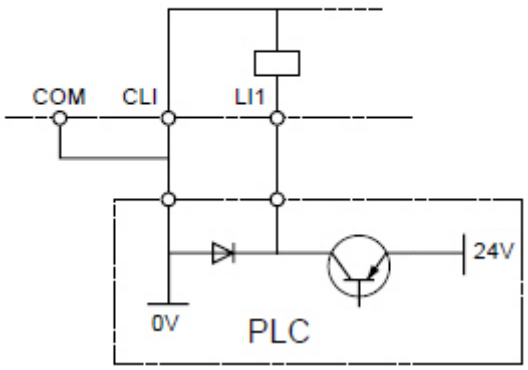
The following is mandatory to ensure that the logic inputs can be energized using controller transistor outputs:

Toggle the logic input configuration switch to CLI position

Connect the CLI terminal to the 0 Vdc reference potential



- Switch in CLI position

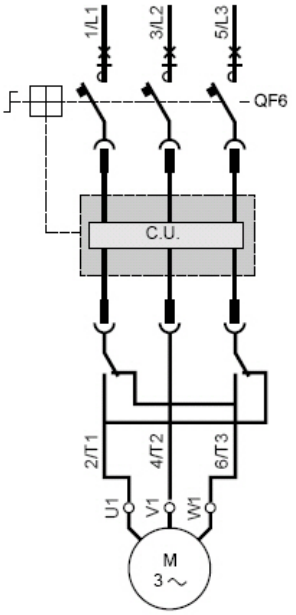


Motor starter

TeSysU

Power base
LU2B12BL
two directions

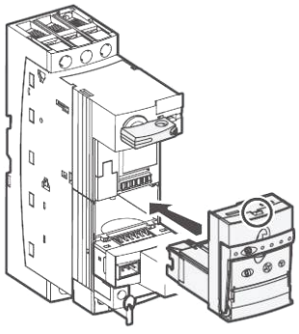
Coil wiring kit
LU2MB0BL

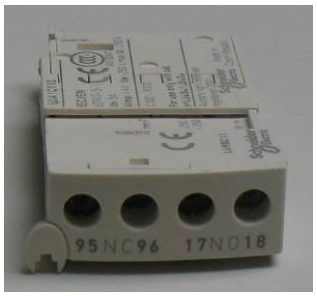
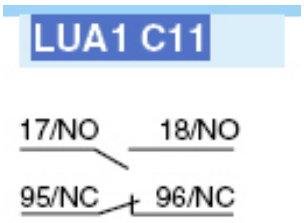
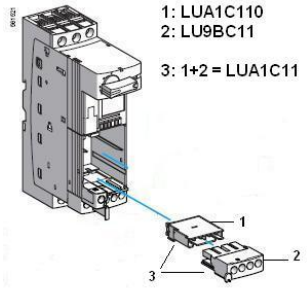
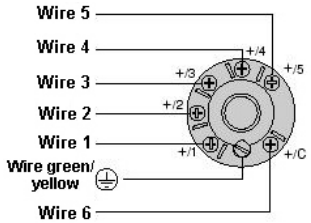


Motor starter

TeSysU

Control unit
LUCA05BL



Motor starter **TeSysU** Auxiliary contact module (NC, Alarm) **LUA1C11**	 	 
Tower light **XVBC**		

Software

General

The main programming work lies in the programming of the Modicon M258 Logic controller and creating the screens for the HMI display.

Programming of the Modicon M258 Logic controller is done by using SoMachine.

Programming of the HMI Magelis XBTGT 4330 HMI is done by using Vijeo Designer, which is integrated into SoMachine.

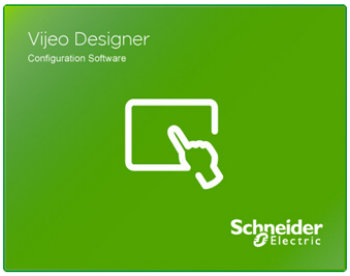
Configuration of the drives (ATV312 and LXM32C) is done using the control panel on the drive.

To use the software packages, your PC must have the appropriate Microsoft Windows operating system installed:

- Windows XP Professional

The software tools have the following default install paths:

- SoMachine
  C:\Program Files\Schneider Electric\SoMachine



- Vijeo Designer (Installed with SoMachine)
  C:\Program Files\Schneider Electric\Vijeo Designer

Communication

General

The Modicon M258 Logic controller and the Magelis XBTGT HMI communicate using the SoMachine protocol on Ethernet.

The download from the PC to the M258 and to the HMI is done using a single connection. The PC has to be connected to the M258 over USB. Using this connection the data is also sent across to the HMI.

The local control panel is used to configure the ATV312 and the LXM32C.

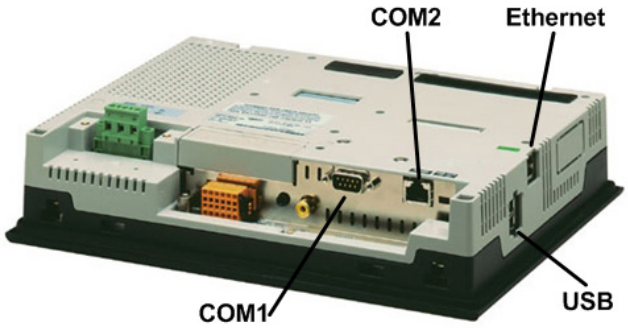
Ethernet 3 port switch **TCSESU033FN0** for connecting the HMI and the Controller	

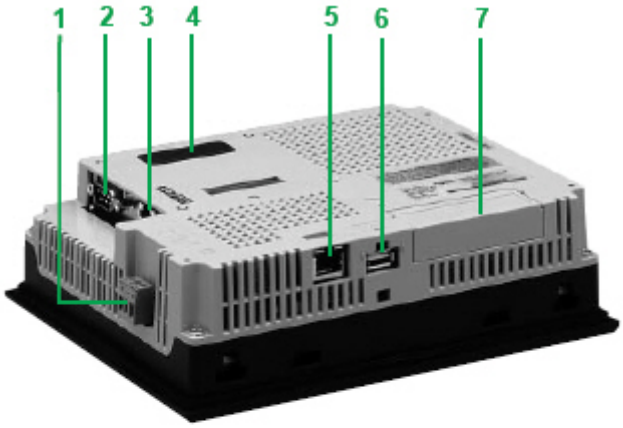
HMI

Magelis

XBTGT4330

The Ethernet connection is used to communicate with the Controller and the PC.





1 A removable screw terminal block for the 24 V ⎓ power supply
2 A 9-way male SUB-D connector for RS 232C or RS 422/485 serial link to PLCs (COM1)
3 An RJ45 connector for RS 485 serial link (COM2) with switch for polarization of the link used on Modbus
4 An expansion unit interface for fieldbus communication card (Device Net, Profibus DP) *(1)*
5 An RJ45 connector for Ethernet TCP/IP link, 10BASE-T/100BASE-TX, with an activity LED
6 A USB type A host connector for connecting peripherals, transferring applications and Modicon M340 terminal port communication
7 A slot for Compact Flash memory card, with pivoting cover
8 A removable I/O connector, 12 spring terminals for loudspeaker connection, one input (reset) and 3 outputs (alarm, buzzer, run).

On XBT GT4340 only:
9 A mini-jack connector for connecting a microphone
10 An RCA connector for connecting a digital or analog video camera (NTSC/PAL)

Ethernet cable

ConneXium

490NTW0000x

This cable is for connecting the

HMI ↔ Controller

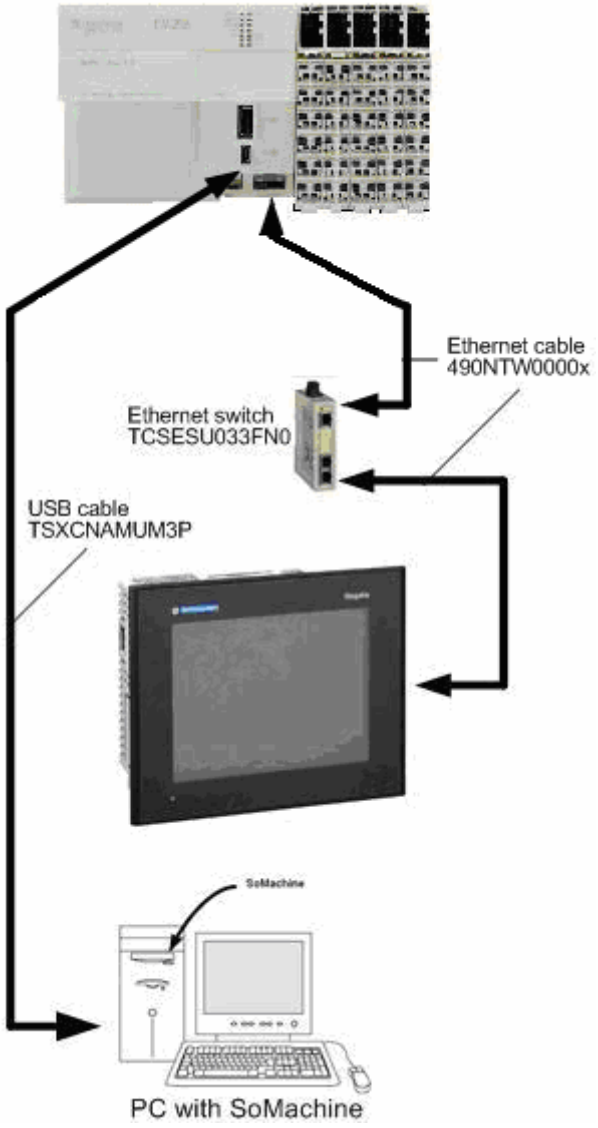
by the Ethernet switch **TCSESU033FN0**.

USB cable TCSXCNAMUM3P

This cable is for connecting the

Controller/HMI ↔ PC (SoMachine)

The download direction is from the PC to the M258 and via the M258 to the HMI



Implementation

Introduction

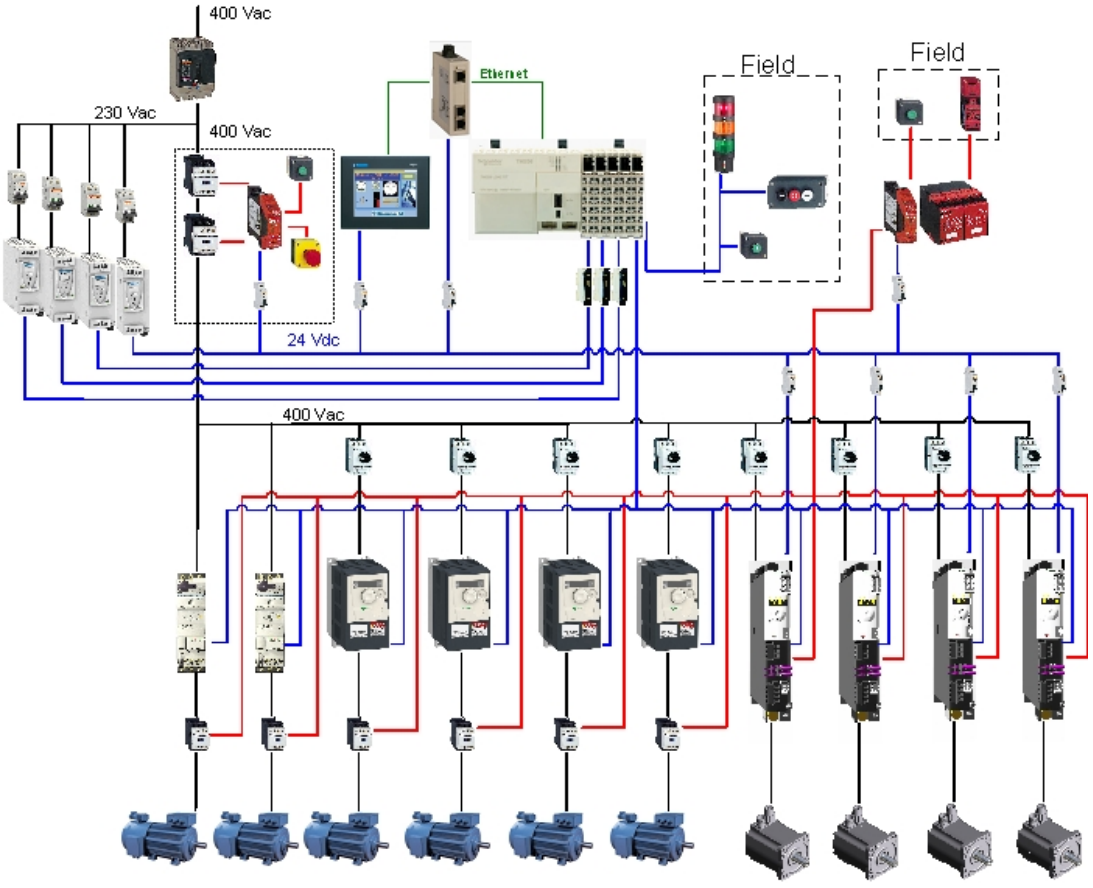
The implementation chapter describes all the steps necessary to initialize, to configure, to program and start-up the system to achieve the application functions as listed below.

Function

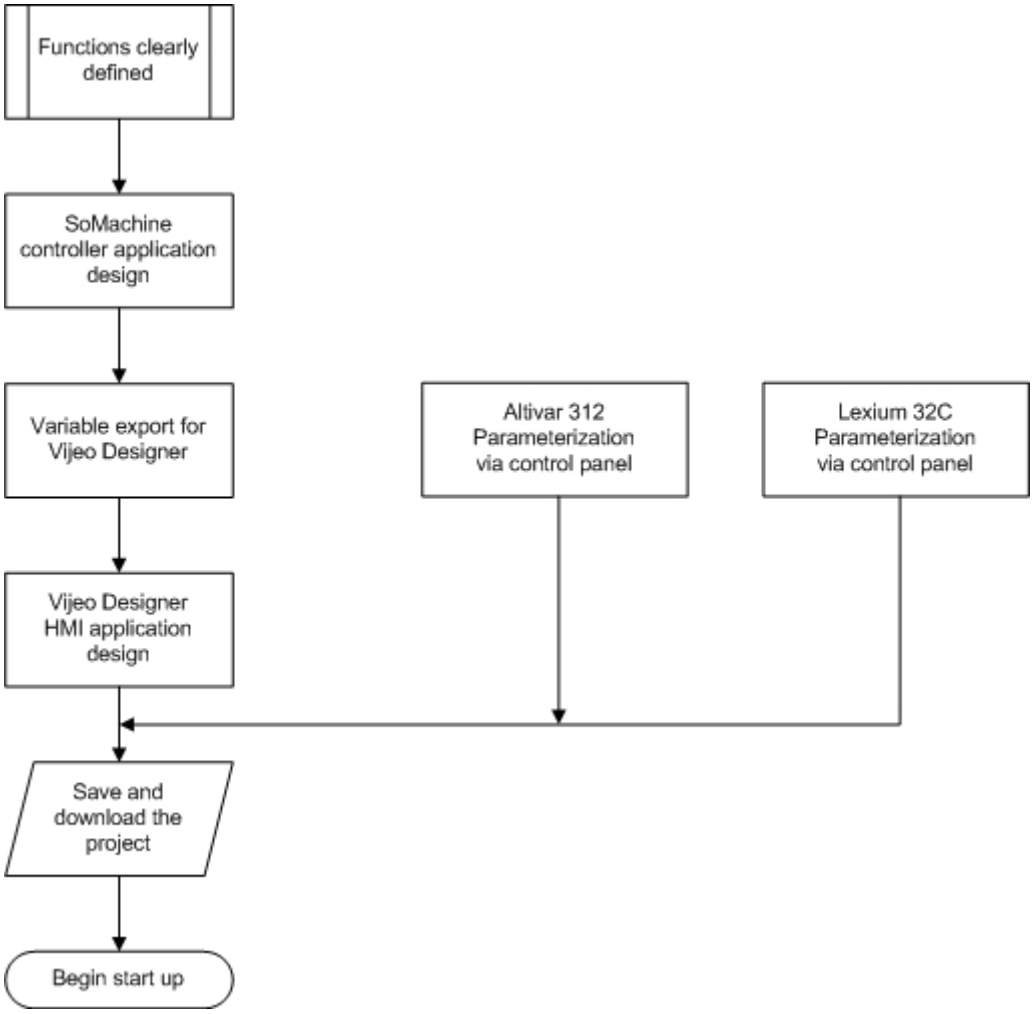
Start up and functional description

1. Ensure all motor circuit breakers and Multi9 circuit breakers are in the ON position.
2. Ensure that the mains switch is in the ON position.
3. Press the "ACKN E-STOP" blue illuminated pushbutton on the main cabinet door to acknowledge the system is energized. The blue illuminated pushbutton will turn OFF if the system is energized.
4. Ensure that all machine interlocks are engaged (i.e. the door guard switches)
5. Press the "ACKN Local" blue illuminated pushbutton on the main cabinet door to acknowledge the system is ready for operation. The blue illuminated pushbutton will turn OFF if the system is ready for operation.
6. Use Magelis XBTGT HMI to control/monitor the system.
    a. Manual Mode: Using the screens TeSys, ATV312 and LXM32C you can control the drives individually by touching the buttons FWD, REV, STOP and RESET. You can also individually adjust their manual speeds here.
    b. Local Mode: Control the drives from the selector switch located outside the cabinet. Reset drive faults by acknowledging the red illuminated pushbutton. Use the screens ATV312 and LXM32C, individually adjust their automatic speeds here.
    c. Use the XBTGT screen to configure the HMI.
    d. The “BUS”, “ALARM”, “SAFETY” screens can be used to monitor the network, system status and alarm messages.

Functional Layout



Course of Action


Functions clearly defined
SoMachine controller application design
Variable export for Vijeo Designer
Vijeo Designer HMI application design
Altivar 312 Parameterization via control panel
Lexium 32C Parameterization via control panel
Save and download the project
Begin start up

Communication

Introduction

This chapter describes the data passed via the communication networks (e.g. CANopen or Ethernet) that is not bound directly with digital or analog hardware.

Device Links

The SoMachine protocol over Ethernet connects:

Magelis XBTGT HMI ↔ Modicon M258 Logic controller

The SoMachine protocol is used for the data exchange between the controller and the HMI.

Controller

Introduction

The controller chapter describes the steps required for the initialization and configuration and the source program required to fulfill the functions.

Requirements

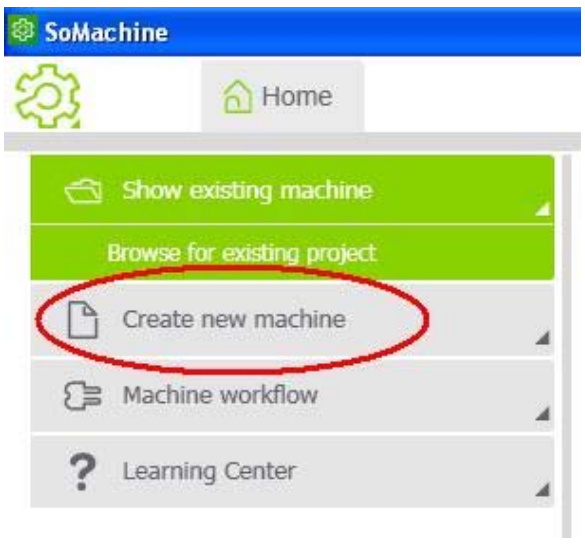
In order to proceed you require the following:

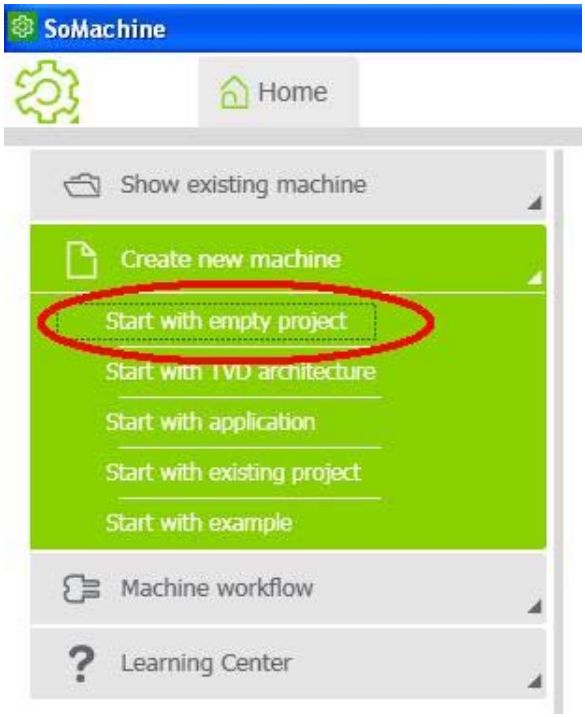
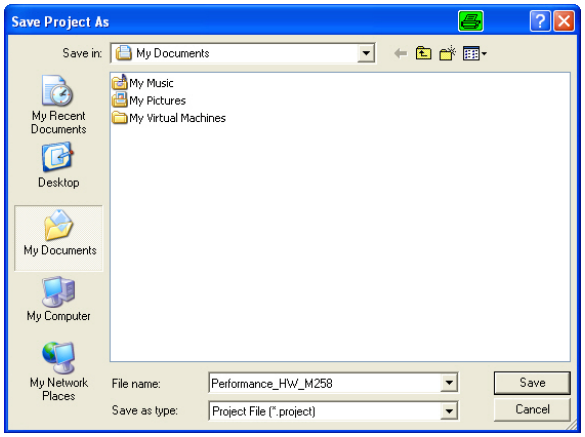
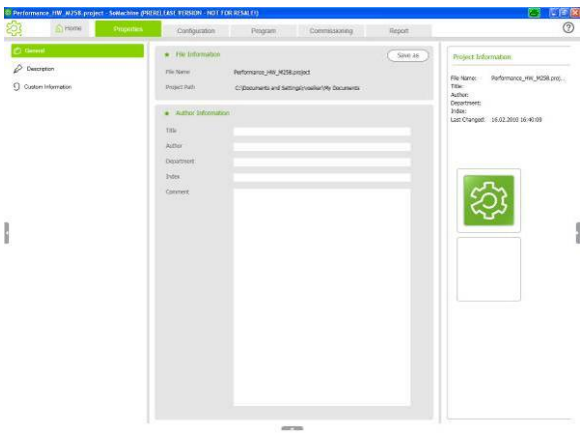
- SoMachine is installed on your PC
- The controller is switched on and running
- The controller is connected to the HMI with the Ethernet-switch **TCSESU033FN0** and the Ethernet cable **490NTW00003** (controller to switch and HMI to switch)
- The controller is connected the PC via the cable USB **TCSXCNAMUM3P**.

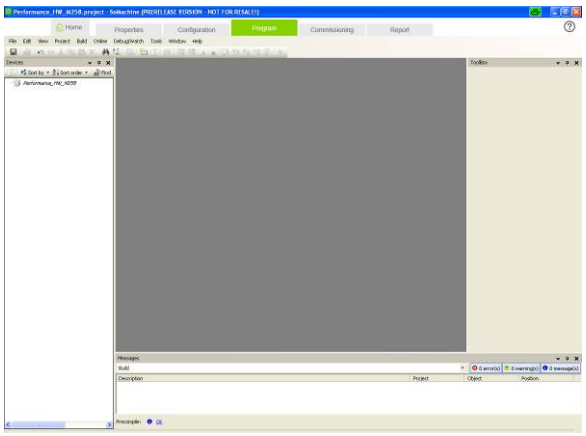
Setting up the controller is done as follows:

- Create a new project
- Add the controller
- Add Expansion Cards
- Configure IO Expansion Modules
- Map IO Module Variables to Existing Variables
- Add TeSys Library
- Add POU
- Task configuration
- Add Vijeo Designer HMI
- Configure controller ↔ HMI data exchange
- Ethernet settings
- Communication settings controller ↔ PC
- Communication settings controller ↔ HMI
- Save the Project
- Build Application
- Download the controller and HMI program
- Login to the controller
- Application overview

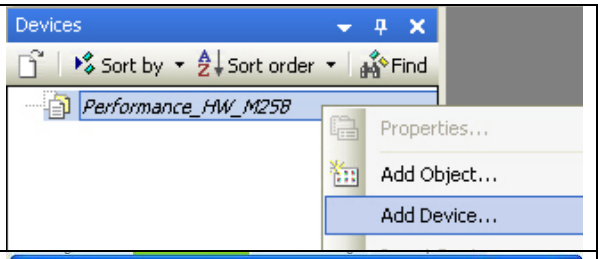
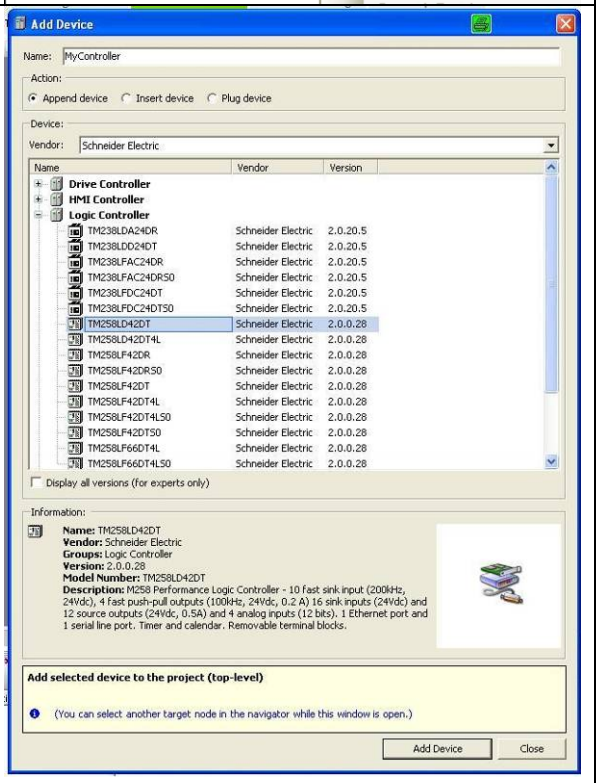
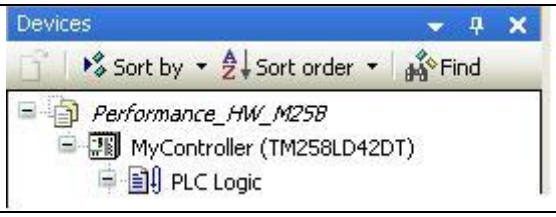
Create a new project

1	To create a new project select **Create new machine.**	

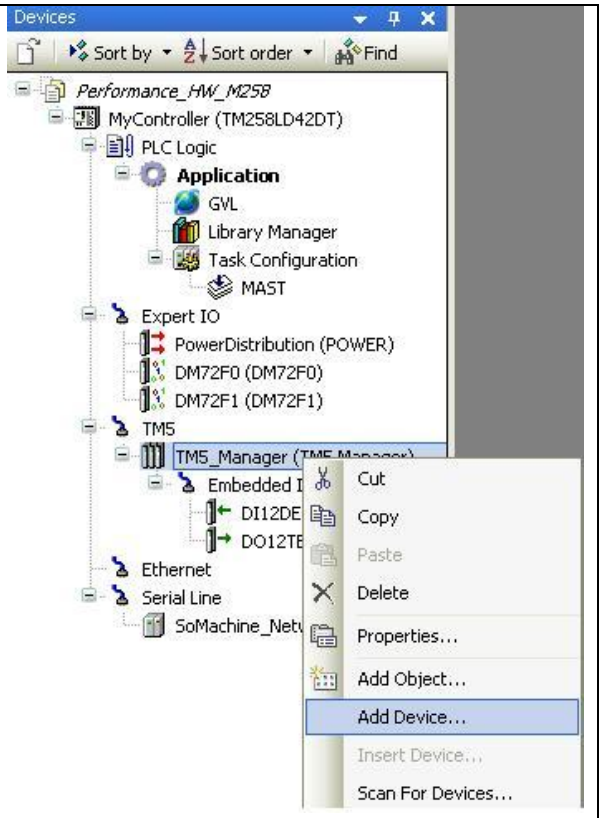
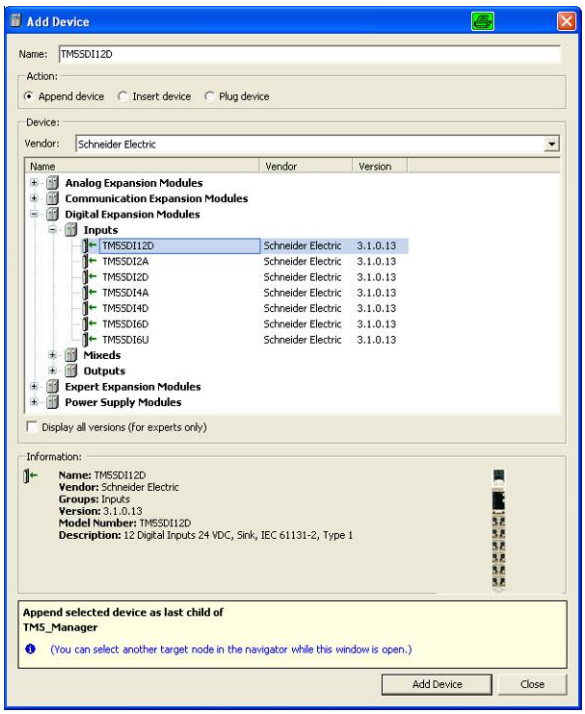
2	Select **Start with empty project.**	
3	In the **Save Project As** dialog box, enter a **File name** and press **Save.** Note : As default the project is saved under My Documents.	
4	The SoMachine User Interface opens.	
5	In the User Interface select the **Program** tab	

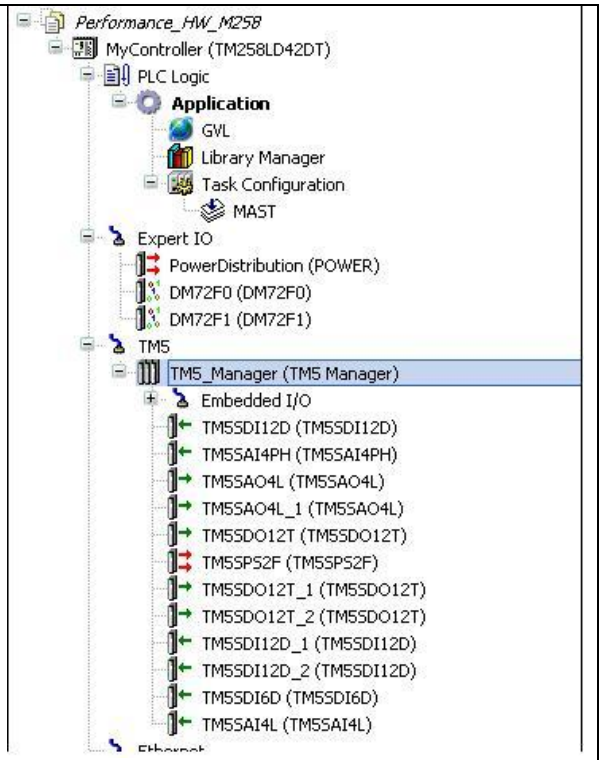
6	The Program windows appears	

Add the Controller

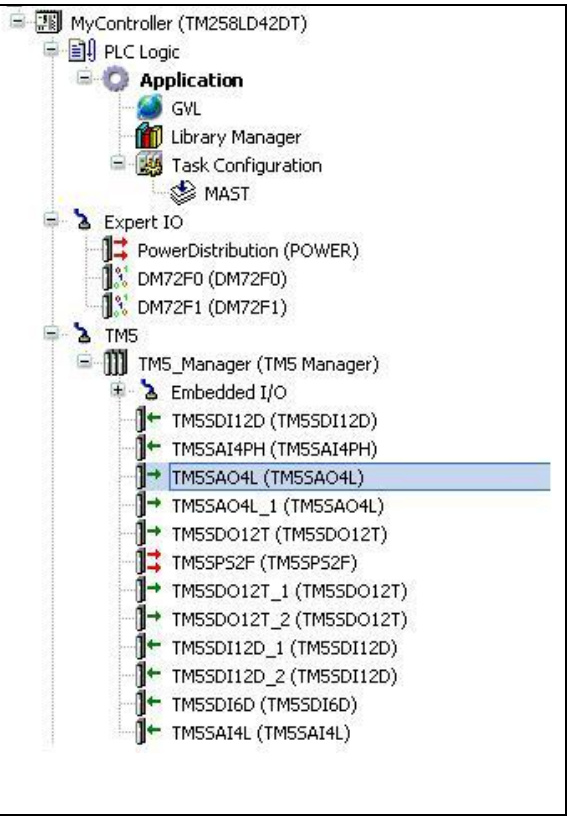
1	Right click on **Performance_HW_M258.** Select **Add Device…** in the pop up menu.	
2	Select **Schneider Electric** as **Vendor**. Then select: **Logic Controller →** **TM258LD42DT** as a controller. Click on **Add Device.** Click on **Close**.	
3	The **Devices** folder display now the new Controller	

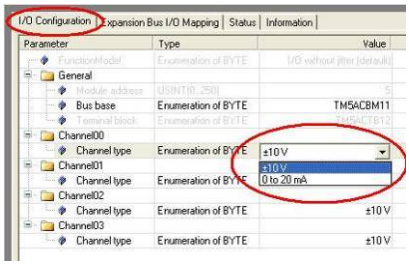
Add Expansion Modules

1	To add expansion modules to the controller, right click on **TM5_Manager** and click on **Add Device…**.	
2	In the **Add Device** dialog, select **Schneider Electric** as **Vendor**, select the required I/O expansion modules and click on **Add Device**. This procedure is for each card necessary. In this project add the following cards in following sequence: - **TM5SDI12D** - **TM5SAI4PH** - **TM5SAO4L** - **TM5SAO4L** - **TM5SDO12T** - **TM5SPS2F** - **TM5SDO12T** - **TM5SDO12T** - **TM5SDI12D** - **TM5SDI12D** - **TM5SDI6D** - **TM5SAI4L** When you have finished adding the modules, click on **Close**.	

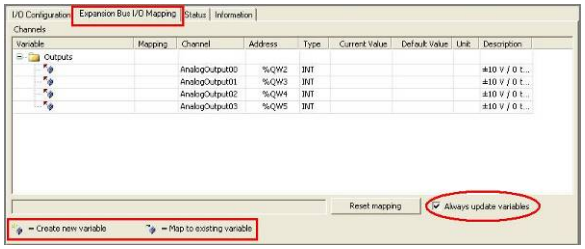
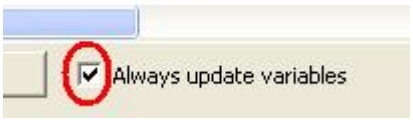
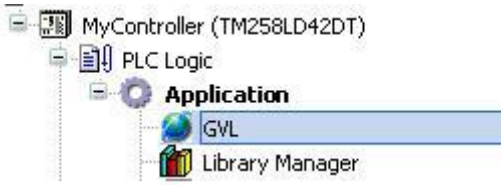
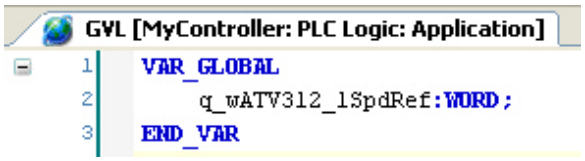
3	The added expansion modules are now visible. Note: The sequence of the modules must be consistent with the sequence of the actual hardware. For example, in this application the TM5SDI12D module is attached to the expansion module interface of the TM5SDO12T (from TM258LD42DT-Package) and the TM5SAI4PH module to the expansion interface of the TM5SDI12D module.	

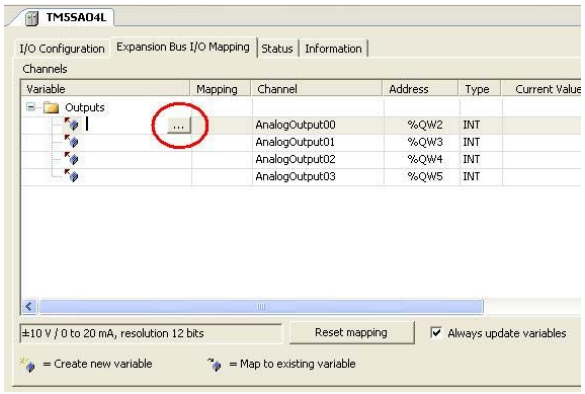
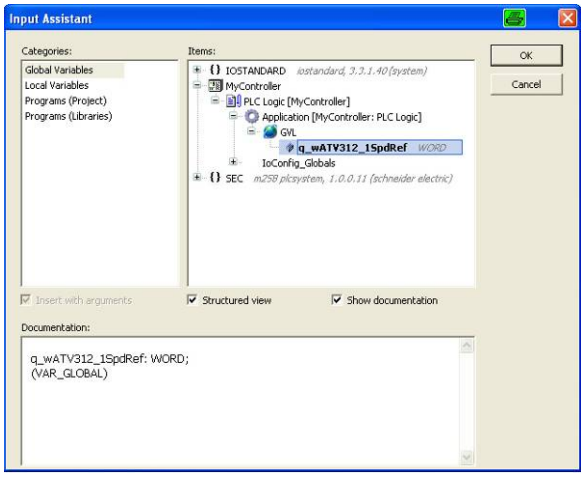
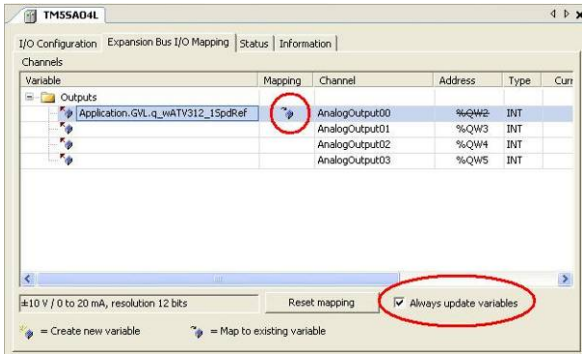
Configure IO Expansion Modules

1	To configure an expansion module, double click on it. Here we will configure the analog output of the expansion module **TM5SAO4L**.	

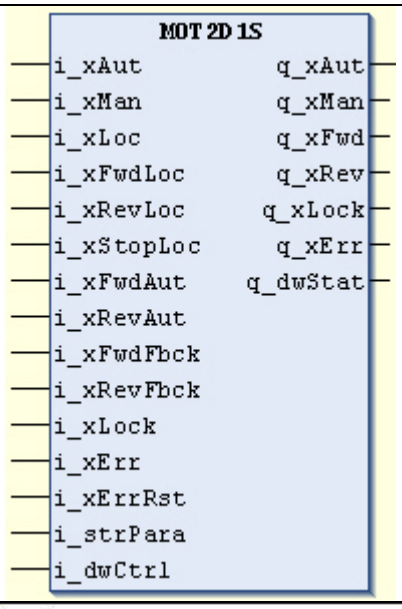
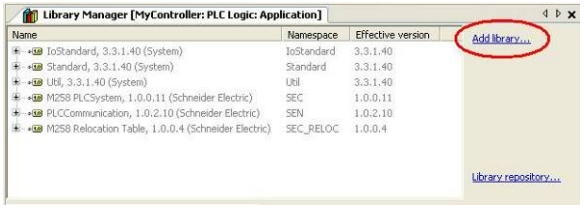
2	In the **I/O Configuration** tab, the **Value** of the **Enumeration of BYTE** for the **Channel type** of **Channel00** is changed to **+/-10 V**. Press Enter to accept the new selection.	

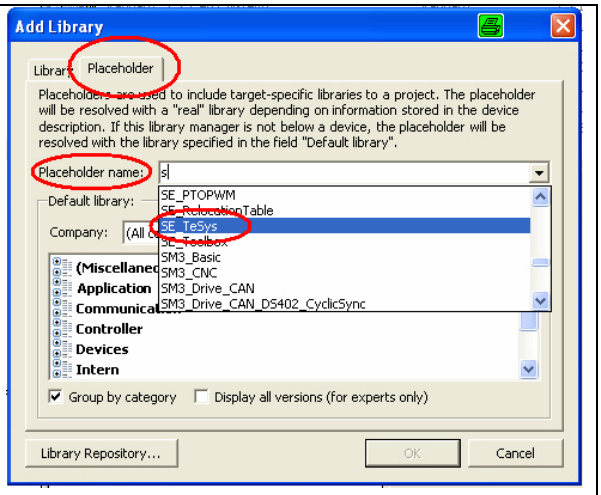
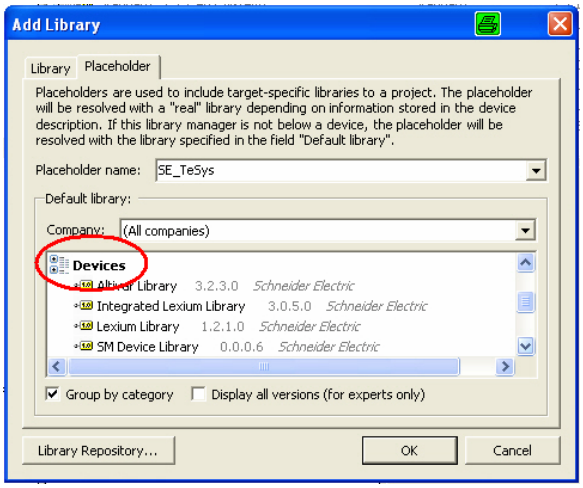
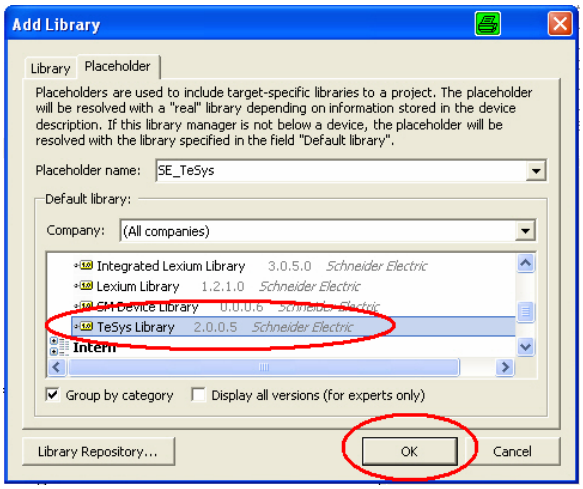
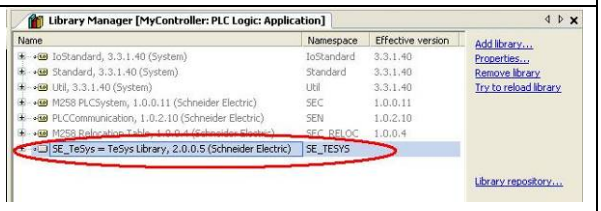
Map IO Module Variables to Existing Variables

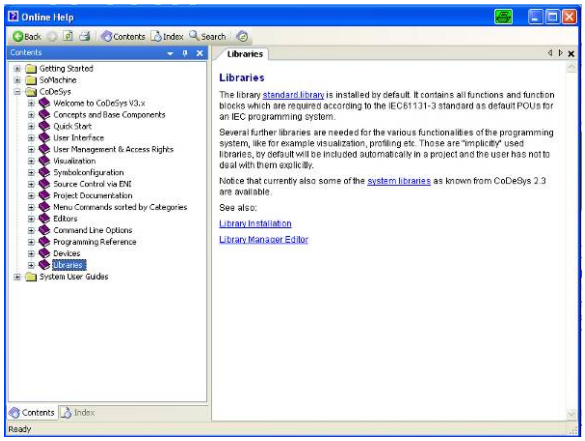
1	On the **Expansion Bus I/O Mapping** tab it is possible to map the data of **QW2** to a variable. There are two ways of Mapping: Create a new variable Mapping to an existing variable To update the variables with the newest I/O data check **Always update variables.** In this project, **Map to existing variable** was used, example the output is mapped to an existing variable that is located in the folder **Application → GVL**. GVL stands for Global Variables List, which can be accessed throughout the **Application** folder. The GVL is opened by double clicking on **GVL** in the Devices browser. In this application, **q_wAtv312_1SpdRef** is declared as a WORD variable in the application's **GVL (Application.GVL.q_wAtv312_1SpdRef)** prior to mapping the data **QW3** to it.	   

2	To map the output to an existing variable, double click on the **Outputs Variable** field then click on the **…** button that appears at the end of the field. In the **Input Assistant** dialog that opens, locate the variable inside the **Global Variables** category and select it. Then click on **OK**.	 
3	The analog module's output WORD, **QW3** now maps itself to **Application.GVL.q_wAtv312_1SpdRef**. To refresh all the I/O variables in every cycle with the latest I/O data, check the **Always update variables** box. If left unchecked, only the status of the I/O variables that are called in the POUs are updated.	

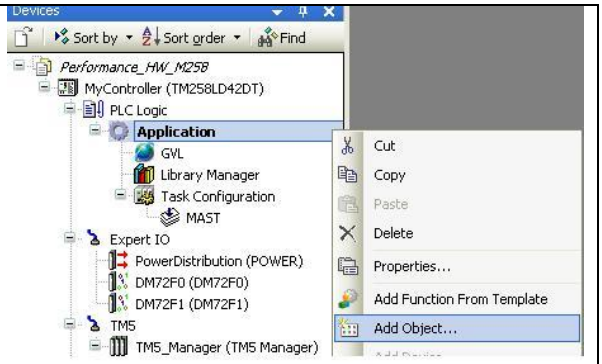
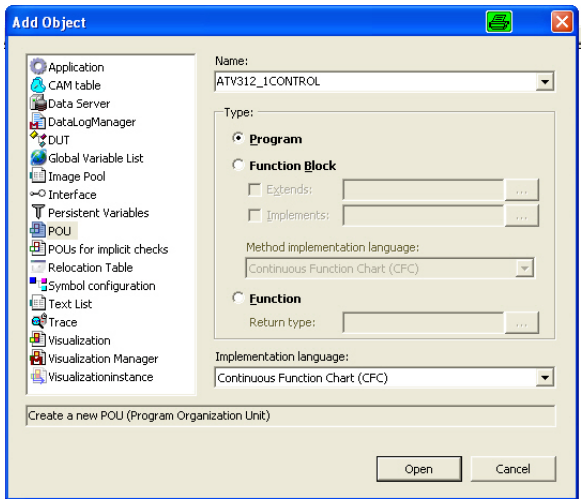
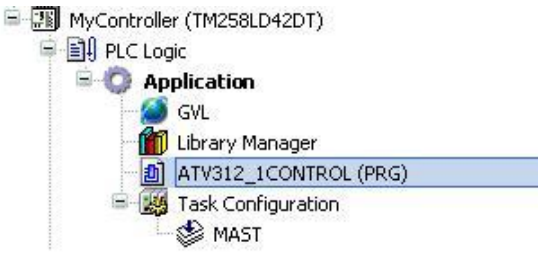
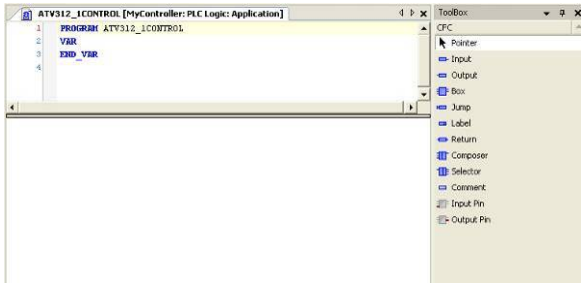
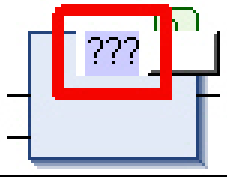
Add TeSys Library

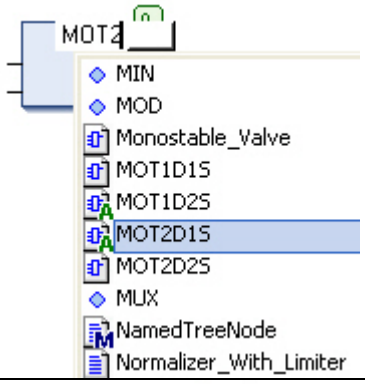
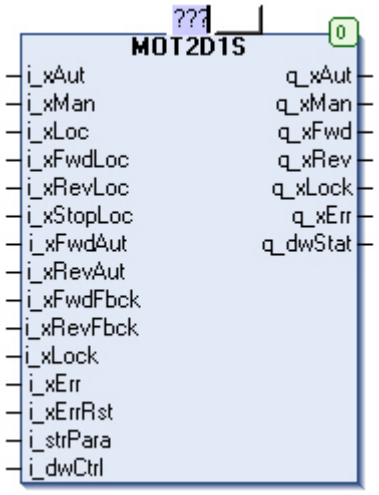
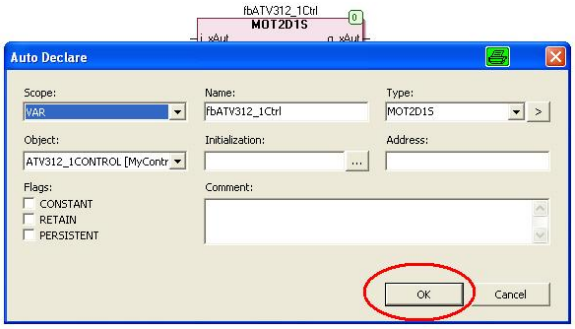
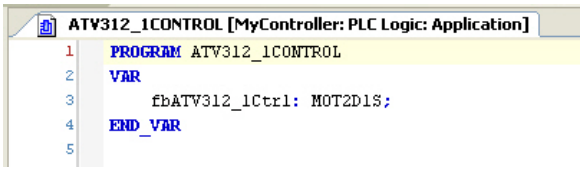
1	In this application, the function blocks **MOT2D1S** were used to manage the forward and reverse control of the ATV312 and LXM32 drives. These function blocks are included inside the TeSys library.	
2	The current libraries in the project can be viewed in the **Library Manager**. Double click on **Library Manager** in the Devices browser to open the Library Manager.	
3	To add the TeSys library, click on **Add library…** in the **Library Manager** editor.	

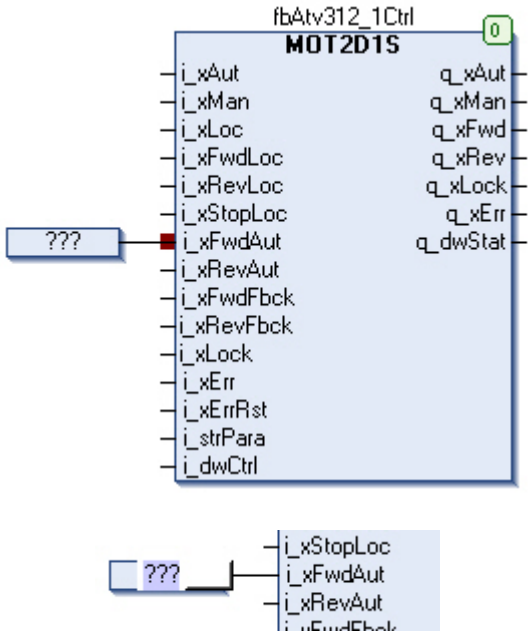
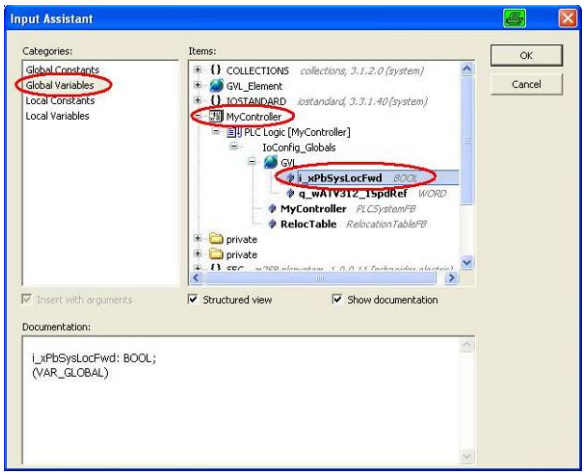
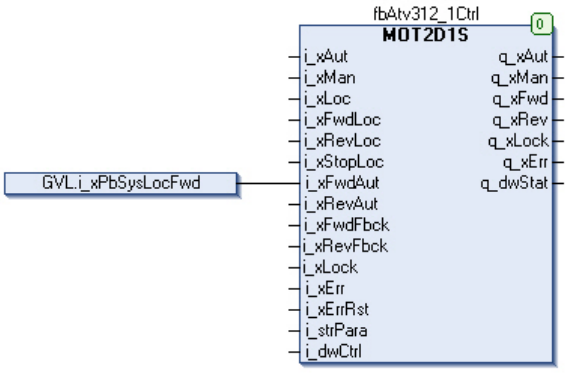
4	In the **Add Library** dialog, **Placeholder** tab, select: **Placeholder name: SE_TeSys** select: **Devices →** select: **→ TeSys Library** And click on **OK** to insert the **TeSys Library** into the Library Manager.	  
5	Now the new libraries can be seen in the Library Manager.	

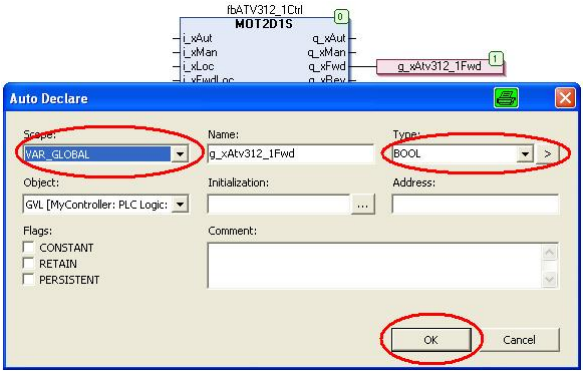
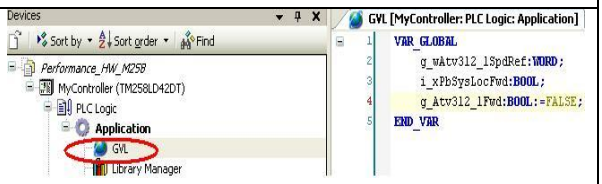
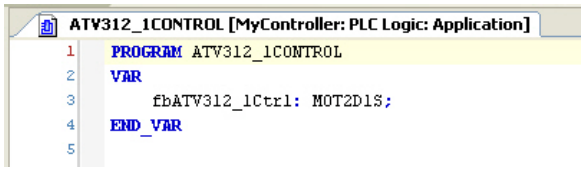
6	More information on the TeSys library, its modules and other Schneider Electric libraries can be found in the **SoMachine Online Help** under the **Help** menu by clicking on **Contents**.	
7	Information on System libraries and their modules can be found in the Online Help under the folder **CoDeSys → Libraries**	
8	Repeat steps 2 to 4 to add more libraries.	

Add POU

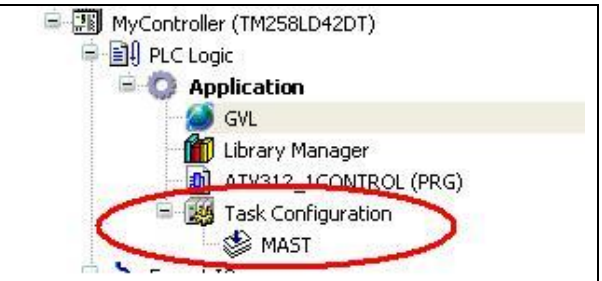
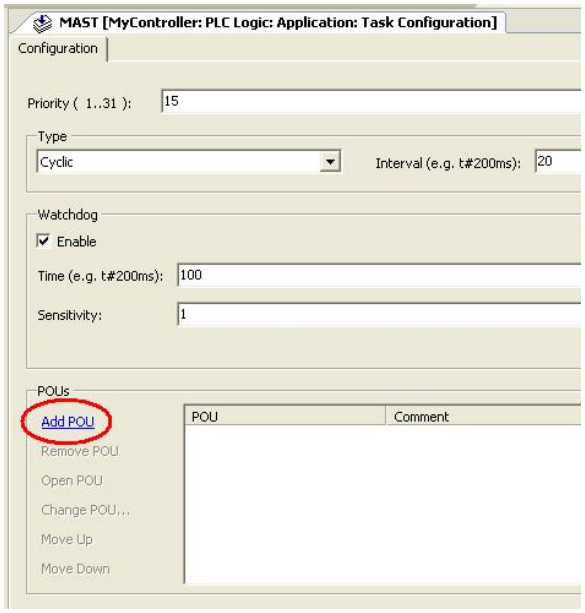
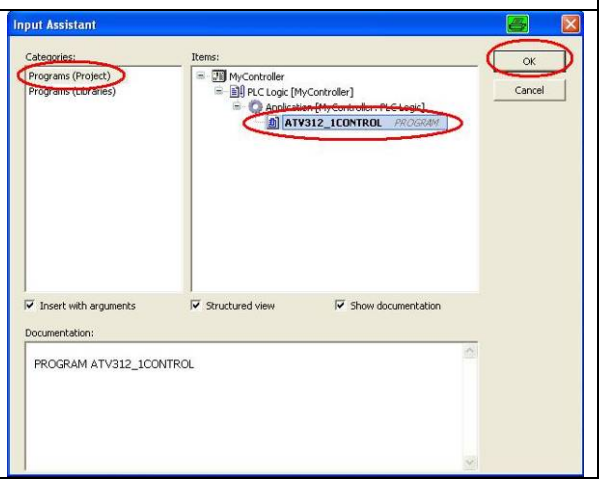
1	To add a POU to the project, right click on **Application** in the **Devices** browser and select **Add Object…** in the pop-up menu.	
2	In the **Add Object** dialog, select **POU** and enter a **Name**. Select **Program** as the **Type** and **Continuous Function Chart (CFC)** as the **Implementation language**. It is possible to select any of the IEC languages and to generate functions and function blocks. Click on **Open** to continue.	
3	The new POU **ATV312_1CONTROL** is now visible in the project browser under the **Application** entry. Double click on **ATV312_1CONTROL** in the project browser will open the editor for the POU **ATV312_1CONTROL**.	
4	The upper frame displays the declaration section. The lower frame is for programming. On the right side is the **ToolBox** window**.** Use drag and drop with the toolbox to place example templates in the programming section.	
5	Beging by placing a box element in the programming section. Then click on the**???** field.	

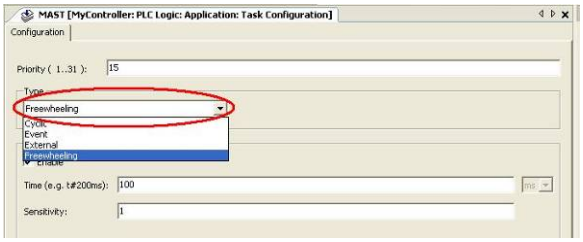
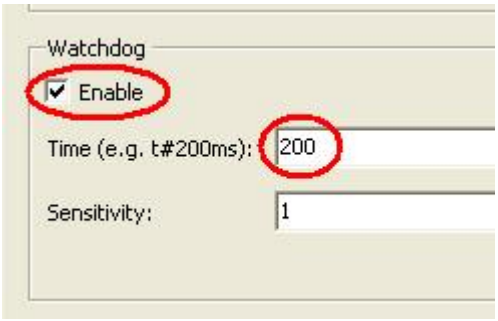
6	Type in a name for the function or function block. When you start to type a hint list opens. In this project, the **MOT2D1S** FB is used for controlling the forward and reverse commands of the drives. Select **MOT2D1S** from the list and press Enter twice.	
7	To instantiate the FB, click on **???** at the top of the template. Type in a name (for example fbAtv312_1Ctrl) and press Enter.	
8	The **Auto Declare** dialog opens. A variable comment can be added in the **Comment** box. Click **OK** to create the instance.	
9	The new FB **MOT2D1S** is instantiated in the declaration section of the **ATV312_1CONTROL**.	

10	To connect a variable to an input, place an input element from the **ToolBox** on the input side of the FB and connect the input box to an FB input by clicking on the red end and dragging it to the input of the FB. To open the Input Assistant dialog: Click on **???** in the input box and press **F8** Or, alternatively: Click on the white box that appears at the end of the field.	
11	In the **Input Assistant** dialog, select **Global Variables** in the **Categories** list. In the **Items** section, select: **MyController →** **PLC Logic →** **IoConfig_Globals →** **GVL** and then the variable (**i_xPbSysLocFwd**). In this project, the variable is a three-position selector switch that is mapped to a global variable. Click on **OK**.	
12	This image shows the FB with the connected input.	

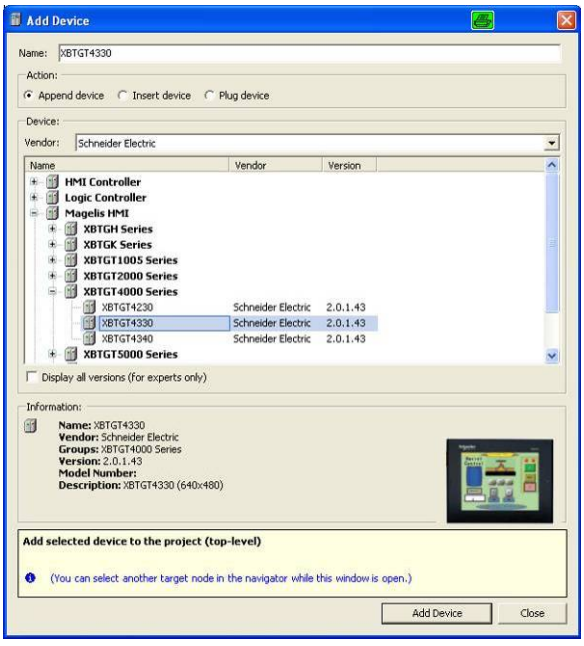
13	Connecting a variable to an output is done similar to the input, but here, a new variable is created. Click on the **???** in the output field, type in a name for the variable and then press Enter. In the **Auto Declare** dialog that opens, select the **Scope** and **Type** and confirm the variable **Name**. In this example, select **VAR_GLOBAL** and **BOOL** from the **Scope** and **Type** list box respectively. When finished, click on **OK.**	
14	The **VAR_GLOBAL** variables are located in the **GVL** folder. All variables located in this folder are globally accessible and can be accessed throughout the application. If the variables are located in the POU, they can only be accessed by the POU (local variables).	 **Global Variables (Application Specific)**  **Local Variables (POU Specific)**

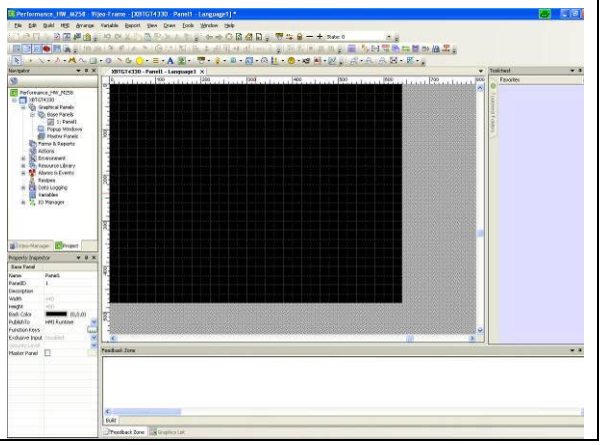
Task Configuration

1	Before you can start working with the new POU you have to add it to a task. Here, the POUs are added to the **MAST** task. To do this double click the **MAST** task and click on **Add POU.** Note: If a POU is not included in a TASK, it will not be invoked.	 
2	Select **Categories** → **Programs (Project)** and select the new POU **ATV312_1CONTROL** in the **Items** list. Then click **OK**. Note: You have to add all POUs in the project.	

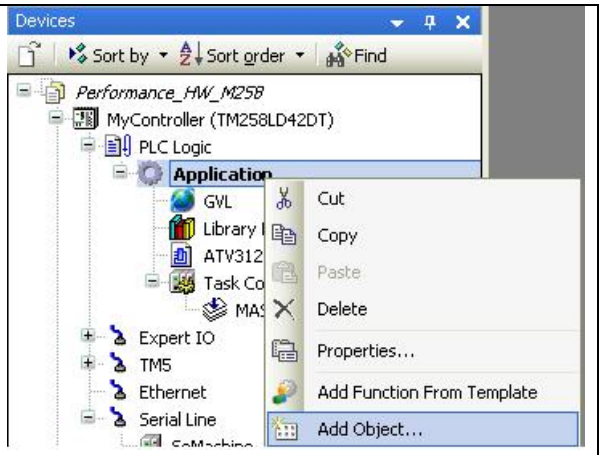
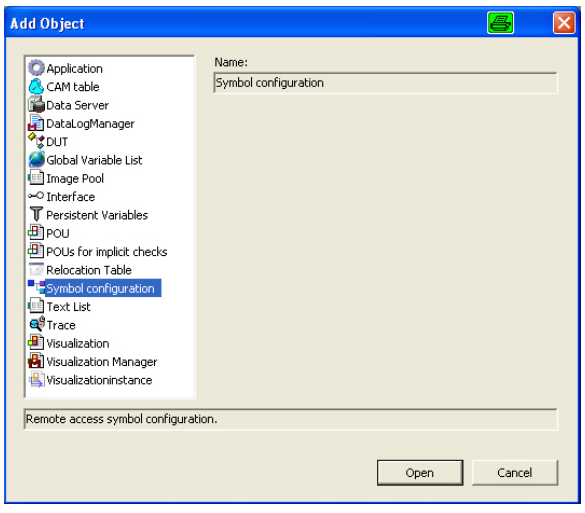
3	Now the POU is in the **MAST** task. In the upper part of the **MAST** task configuration you can change the **Type** of the task. In this project it is F**reewheeling.** Direct under the **Type** menu is the **Watchdog** field. Set the Watchdog **time** to **200 ms.**	 

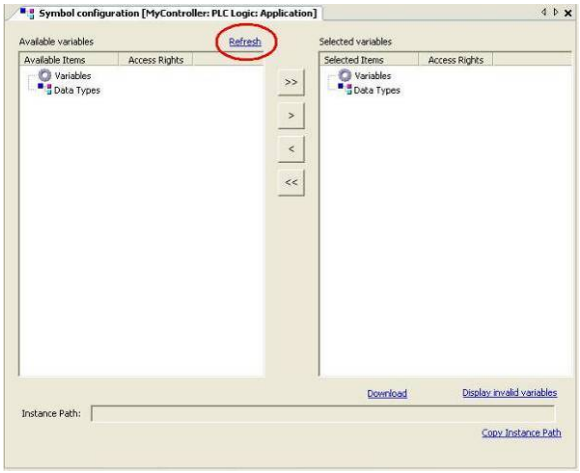
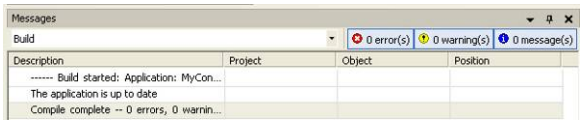
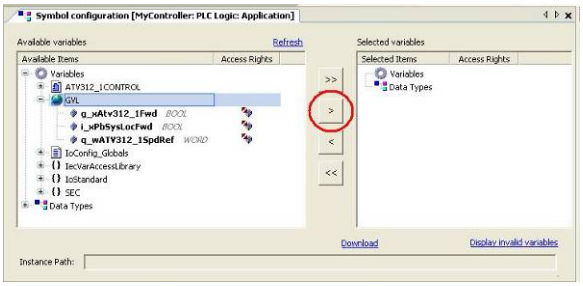
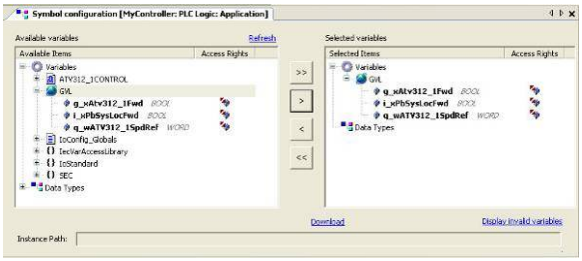
Add Vijeo Designer HMI

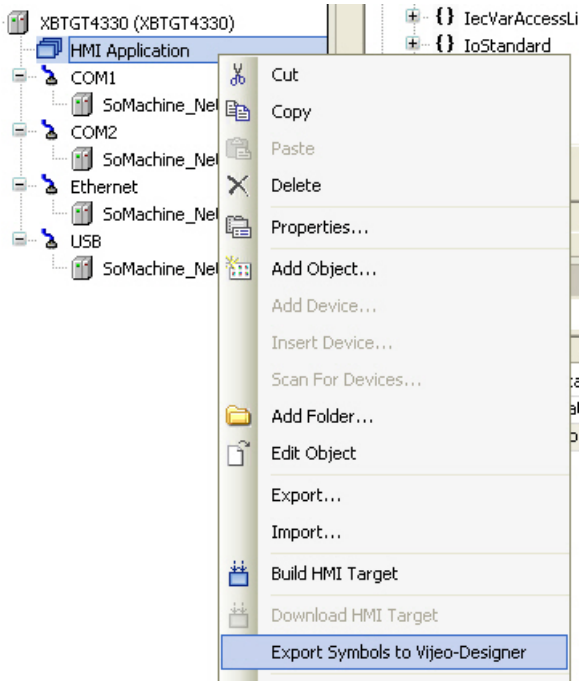
1	To add a Magelis HMI unit to the project, right click on the project name and select **Add Device…** from the pop-up menu. In this project, it is **Performance_HW_M258 → Add Device…**	
2	In the **Add Device** dialog, select **Schneider Electric** as **Vendor.** Click on: **Magelis HMI → XBTGT4000 Series → XBTGT4330** Click on **Add Device**. Then click on **Close**.	

3	The new **XBTGT4330** is now listed under the project in the **Device** window. Note: When a Magelis HMI is added to a project, the programming software Vijeo Designer opens in a new window and you can start programming. (See HMI Chapter)	 

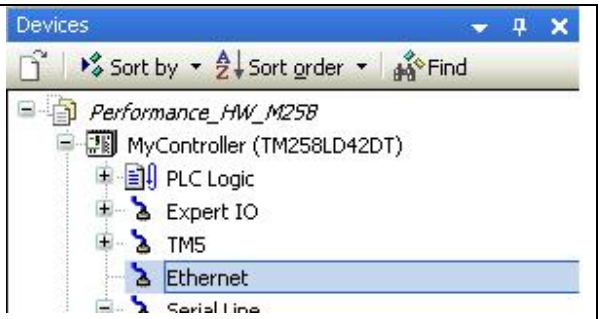
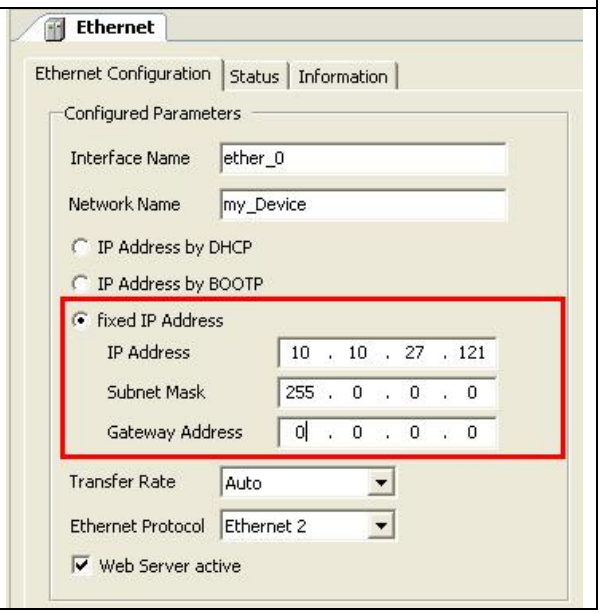
Configure Controller ↔ HMI Data Exchange

1	To link the variables between the controller and the HMI, the object Symbol configuration is used. To add a Symbol Configuration, right click on **Application** and select **Add Object…** from the pop-up menu.	
2	Select **Symbol configuration** in the **Add Object** dialog. Click on **Open**.	

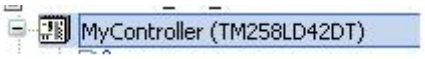
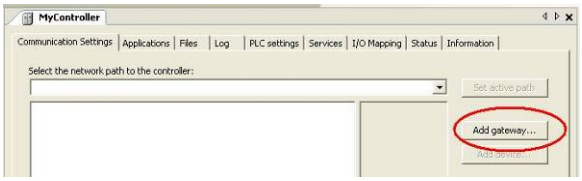
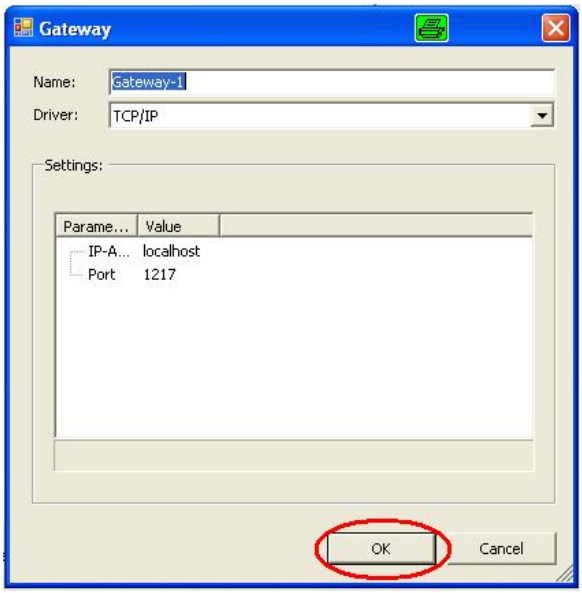
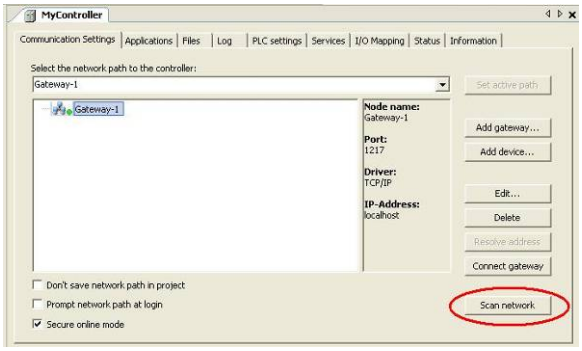
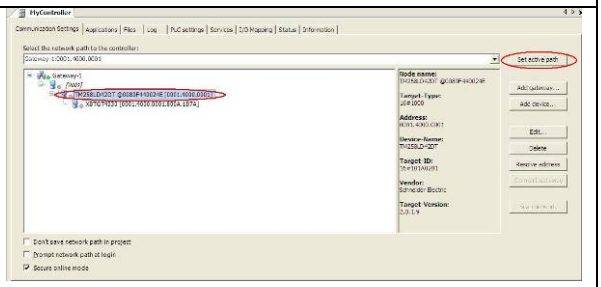
3	In the opened **Symbol configuration** tab, click on **Refresh**.	
4	Check the **Messages** window for the compilation result and correct any compilation errors. To locate a compilation error, double click on the compilation error message. There are no compilation errors or compilation warnings in our example project. Note: The **Symbol configuration** cannot be refreshed when there are compilation errors in the program.	
5	All Variables created in the user program are shown in the **Available variables** list. In this project, as all variables are global variables, they are located in the **GVL** folder. To link the variables from the controller to the HMI, select **GVL** and click on **>**.	
6	The right frame now lists the **Selected variables** which are to be used the HMI.	

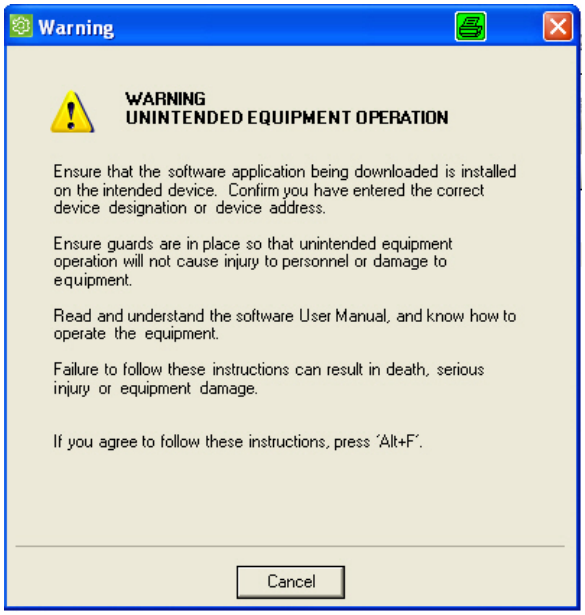
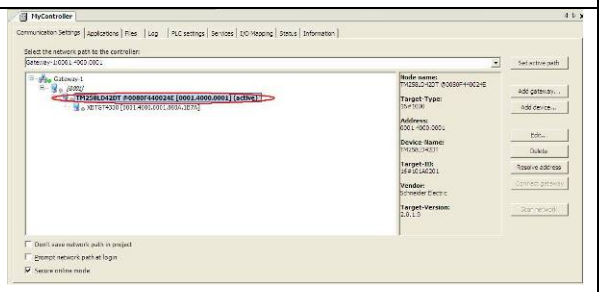
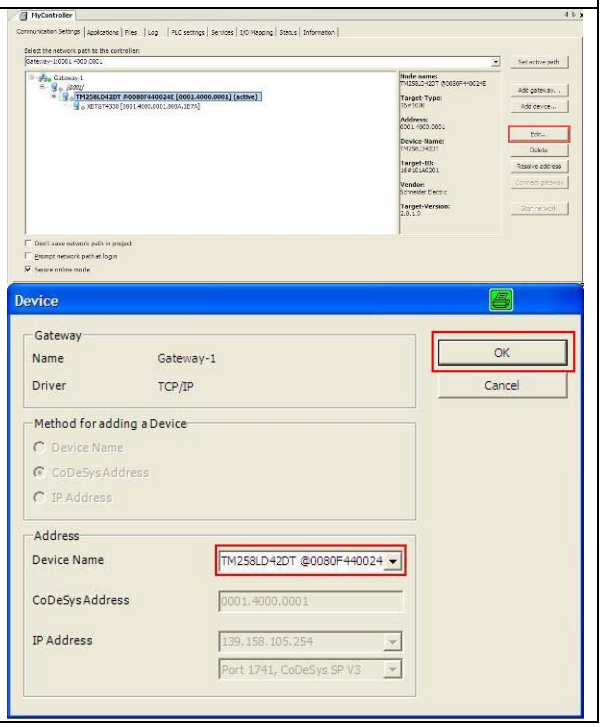
7	To export the selected variables to Vijeo Designer right click on **HMI Application** and select **Export Symbols to Vijeo-Designer.**	

Ethernet settings

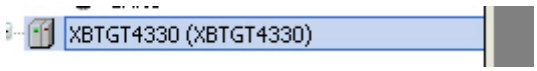
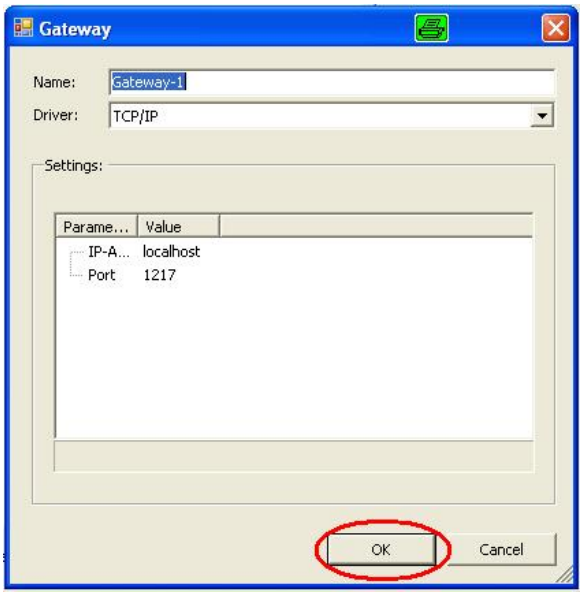
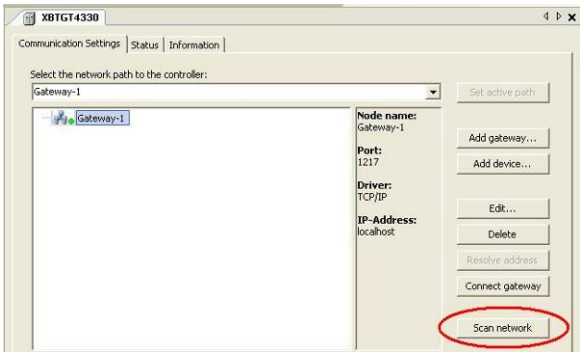
1	To change the Ethernet settings double click **Ethernet** in the project browser.	
2	Check the **fixed IP Address** box and set an **IP Address** (In this project **10.10.27.121**) and a **Subnet Mask** (In this project **255.0.0.0**) **Note:** For the initial download of the project, the USB cable **TCSXCNAMUM3P** must be used. For subsequent downloads, an Ethernet connection could be used.	

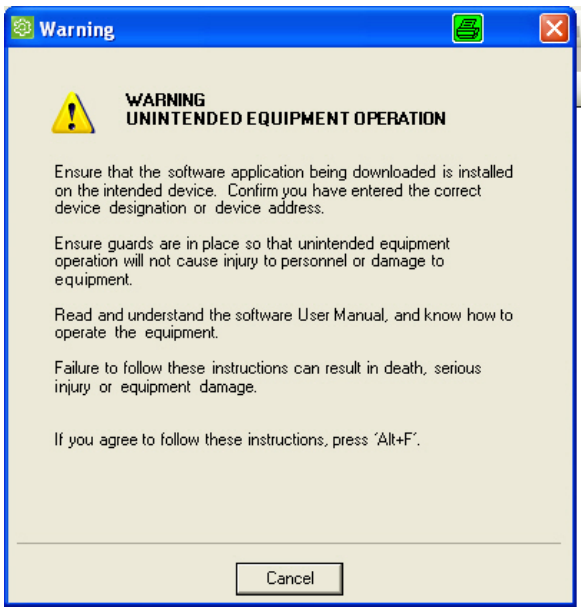
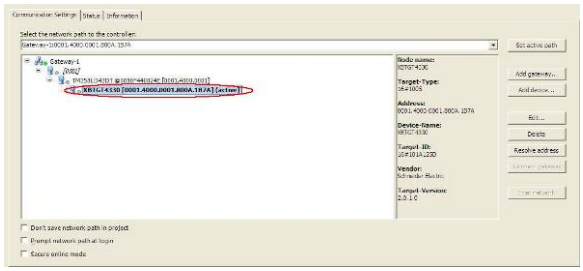
Communication setting Controller ↔ PC

1	To configure the communication gateway double click on **MyController**.	
2	On the **Communication Settings** tab click on: **Add gateway...**	
3	Keep the factory settings and click on **OK.**	
4	Select **Gateway-1** and click on **Scan network.**	
5	When the scan is finished, the devices pop up under the gateway. Select the used Controller and click **Set active path.**	

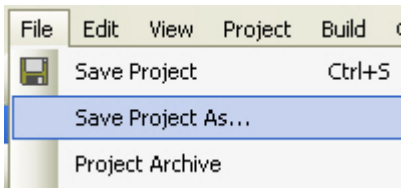
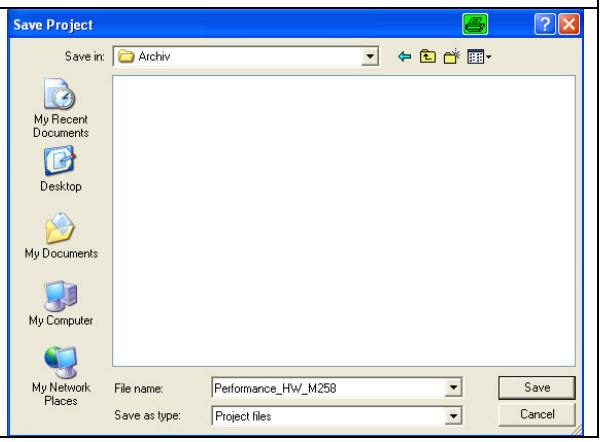
6	Before continuing read the notification carefully.	
7	The used Controller is now marked as **active.**	
8	**NOTE:** Every M258 has a unique MAC address that is a part of the default name (in this case: **@0080F440024E**). If you would like to change the default name of your controller: click on **Edit…** In the displayed pop-up window go to the **Device Name** field and enter the new unique name for your controller. In our example we kept the factory setting name.	

Communication Setting HMI ↔ PC

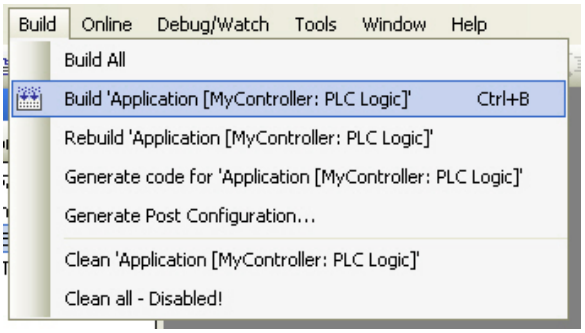
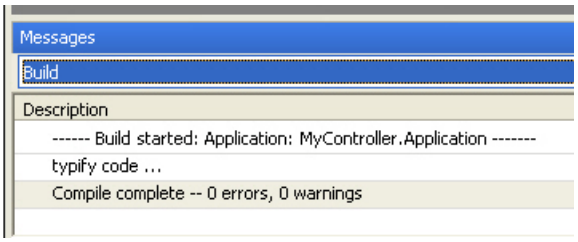
1	To configure the communication gateway double click on **XBTGT4330** in the project browser.	
2	On the **Communication Settings** tab, click on **Add gateway…**	
3	Retain the factory values and click **OK.**	
4	Select **Gateway-1** and click **Scan network.**	
5	When the scan is finished, the devices appear under the gateway. Select the used HMI and click on **Set active path.**	

6	Before continuing read the notification carefully.	
7	The used HMI is now marked as **active.**	

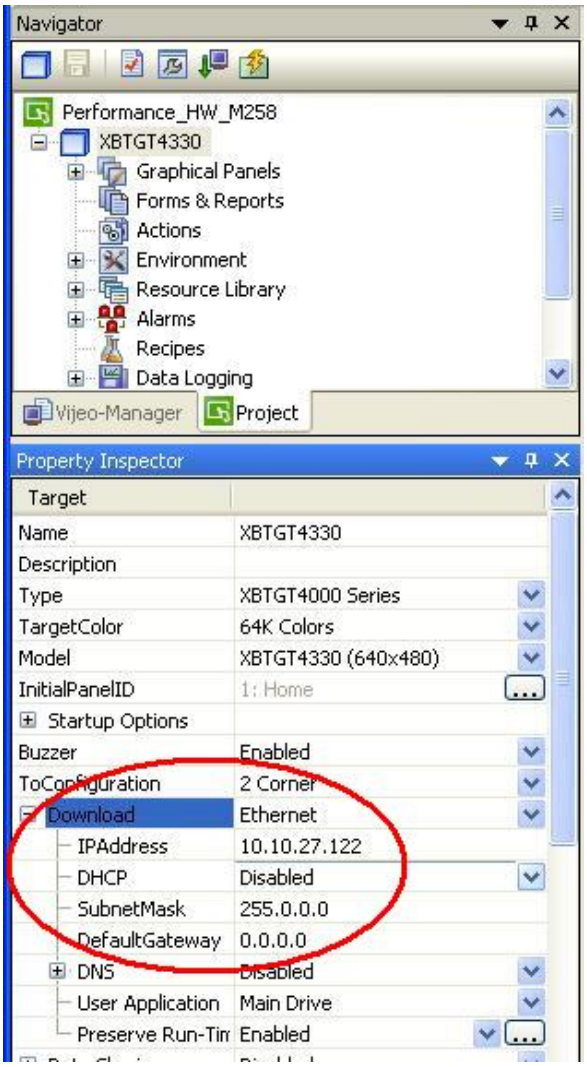
Save the Project

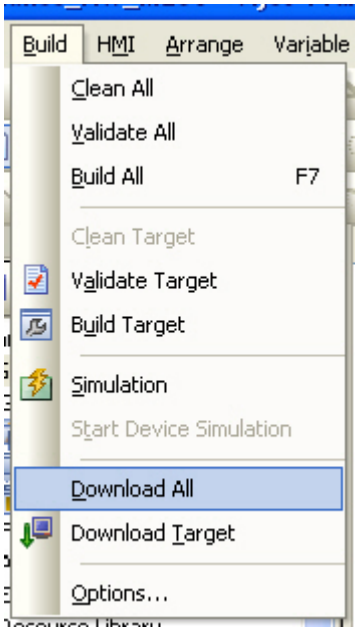
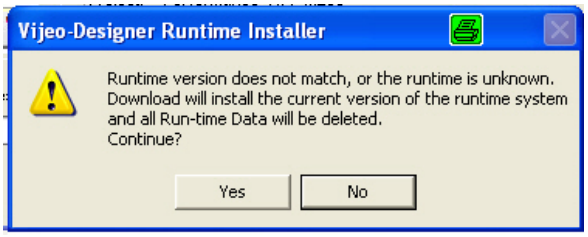
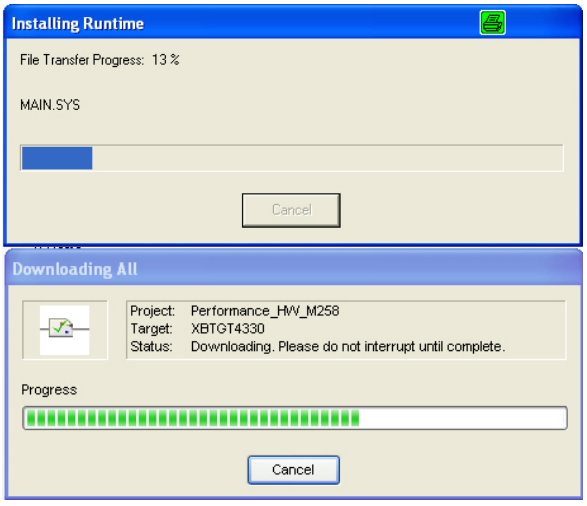
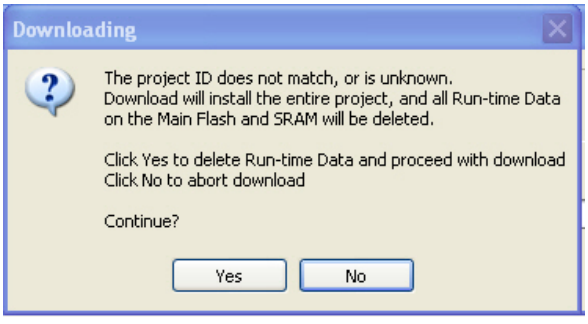
1	To save the project, click **File → Save Project** To save the project under a different name, click **File → Save Project As…**	
2	In the **Save Project** dialog that opens after clicking on **Save Project As…**, enter the new **File name** and click on **Save**.	

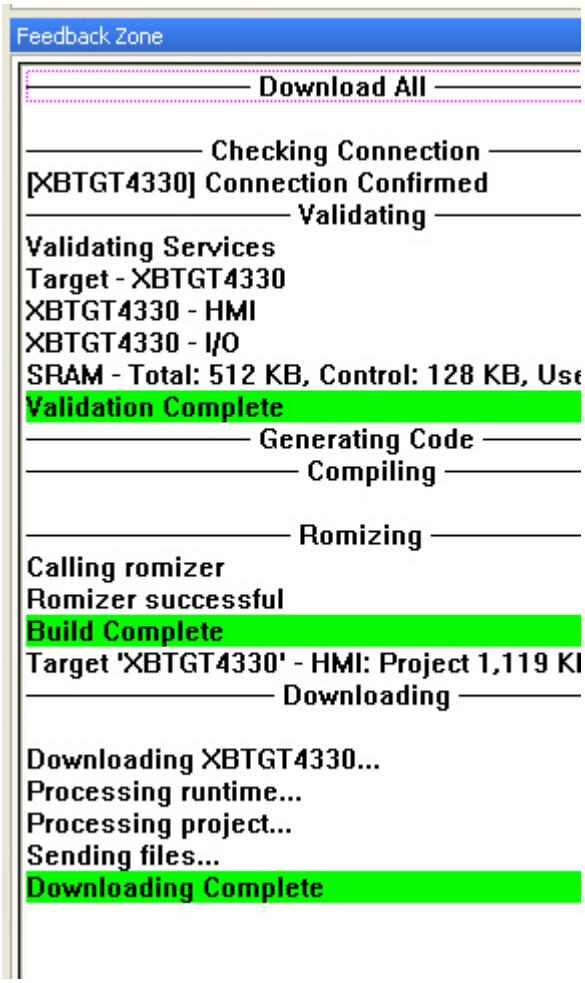
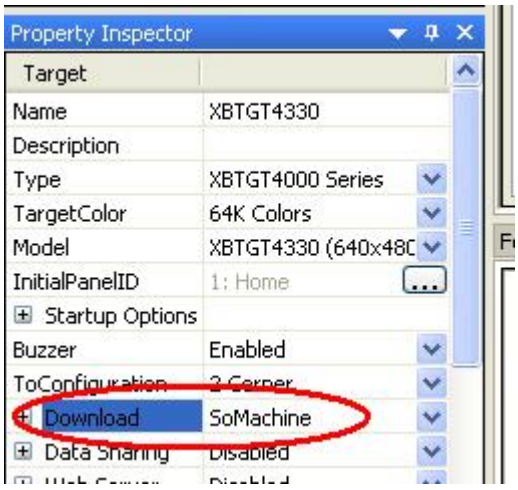
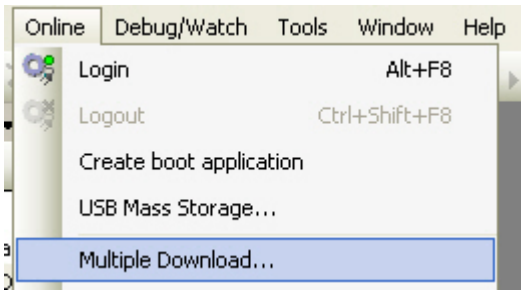
Build Application

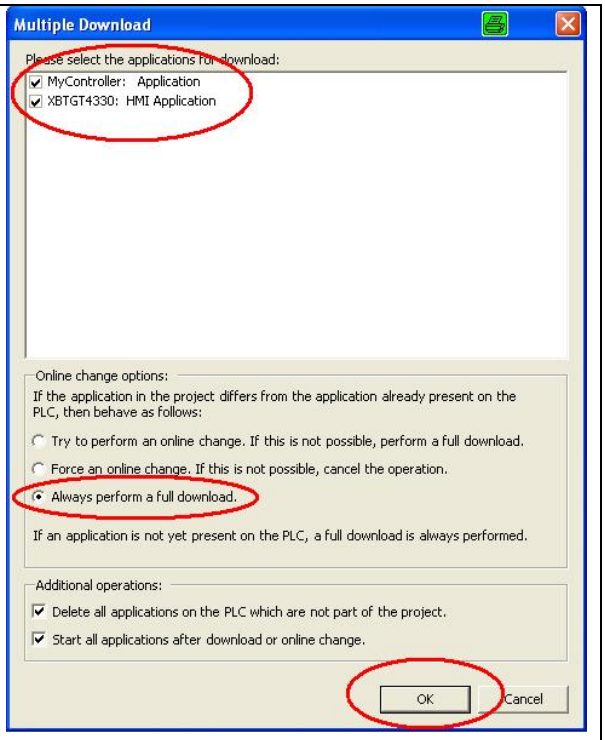
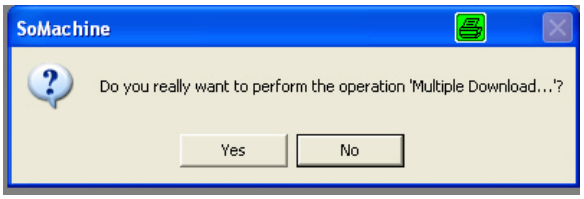
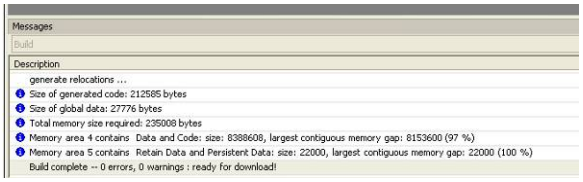
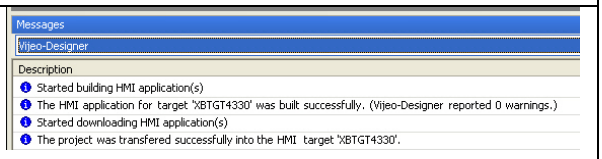
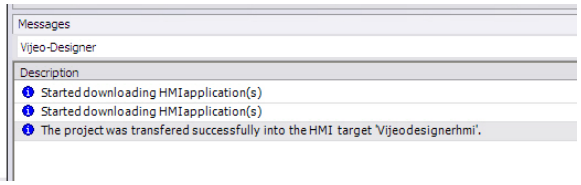
1	To build the application click on **Build→Build 'Application [MyController: PLC Logic]'.** Note: If you wish to build the entire project (HMI and Controller) click **Build All**	
2	After the build you are notified in the **Messages** field as to whether the build was successful or not. If the build was not successful there will be a list of messages in the **Messages** field.	

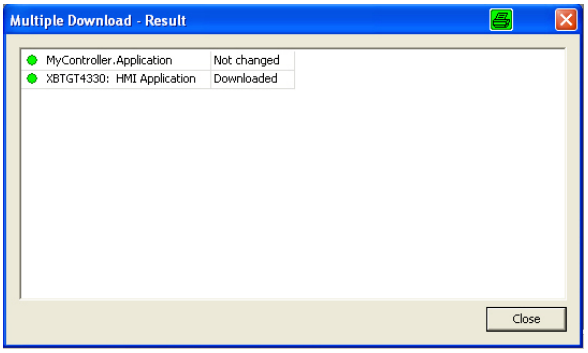
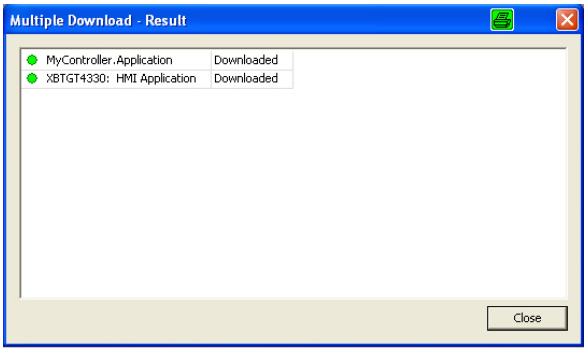
Download the Controller and HMI projects

1	**NOTE:** If it is the first time you are connecting to the Magelis HMI you will need to first download the latest runtime version to the Magelis HMI using Vijeo Designer. This first download is described in the following steps. If this is not the first download go directly to step 9	
2	In Vijeo Designer select the HMI in the device list. Then in the **Property Inspector** select **Download** via **Ethernet.** Note: The PC should be connected to the HMI via the Ethernet switch **TCSESU033FN0** and the Ethernet cable **490NTW0000x**.	

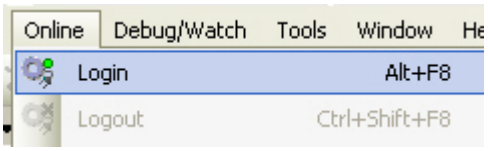
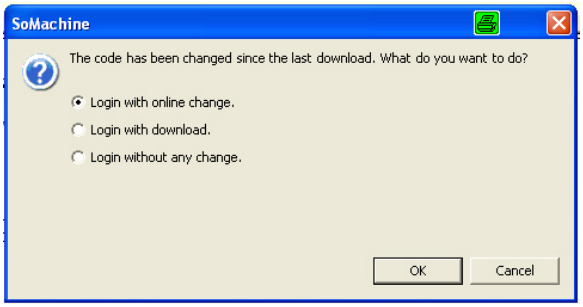
3	Select: **Build → Download All**	
4	The **Vijeo-Designer Runtime Installer** dialog indicates that the runtime version does not match. Start the download of the new version by clicking on **Yes**.	
5	The actual state of the download is displayed in a progress bar.	
6	If the Project ID does not match you will see this message. Acknowledge with **Yes** to proceed the download.	

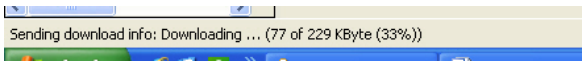
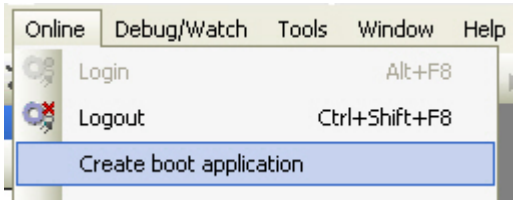
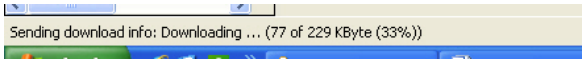
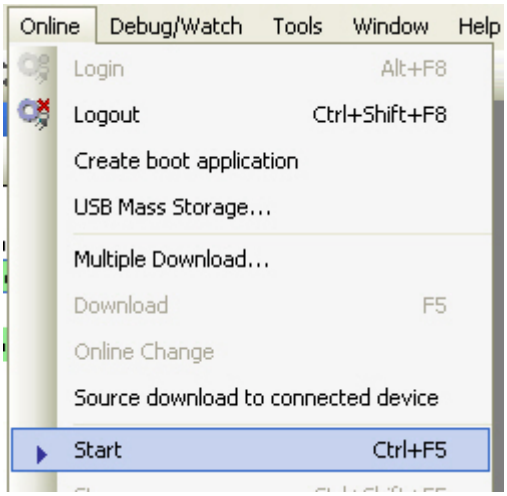
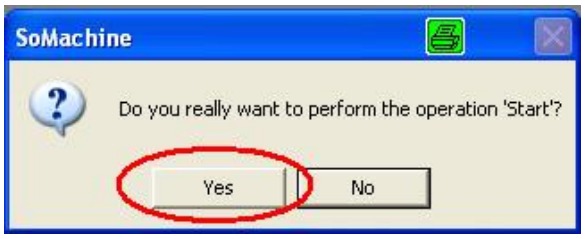
7	During the download procedure the system creates messages, which you can see in the **Feedback Zone**.	
8	Once the runtime download is complete, change the **Download** connection in the **Property Inspector** back to **SoMachine.**	
9	To download the application to the Controller and the HMI select **Online →** **Multiple Download…**	

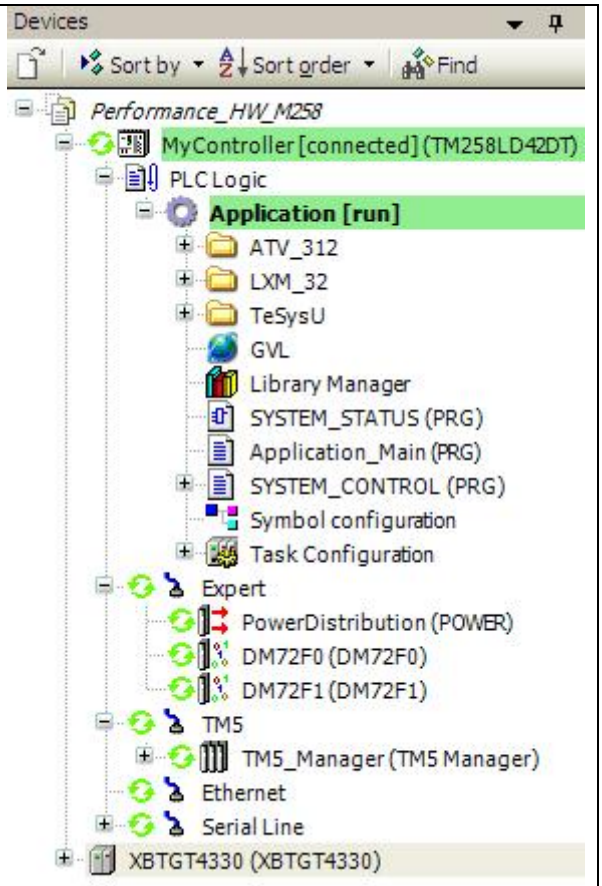
10	Check the Controller (**MyController)** and the HMI **(XBTGT4330)** and **Always perform a full download**. Click on **OK**.	
11	Acknowledge this message with **Yes** to perform the download.	
12	Before the download starts, a build of the complete project is done. The result of the build is displayed in the **Messages** window.	
13	Once the download to the Controller is finished, the HMI download starts.	
14	The result of the HMI download is displayed in the **Messages** window.	

15	The results of the **Multiple download** to the Controller are displayed in the **Multiple Download – Result** window**.** Here are two examples: In the first dialog there was no change and you select **Try to perform an online change**. And in the second dialog there was an online change done and you select **Try to perform an online change** (see screen "**Multiple Download"** in step 10). The same dialog you will see, if you select **Always perform full download** (see screen "**Multiple Download"** in step 10), even you did not made any changes in the Controller-Program Click on **Close** to close to the results window**.**	 

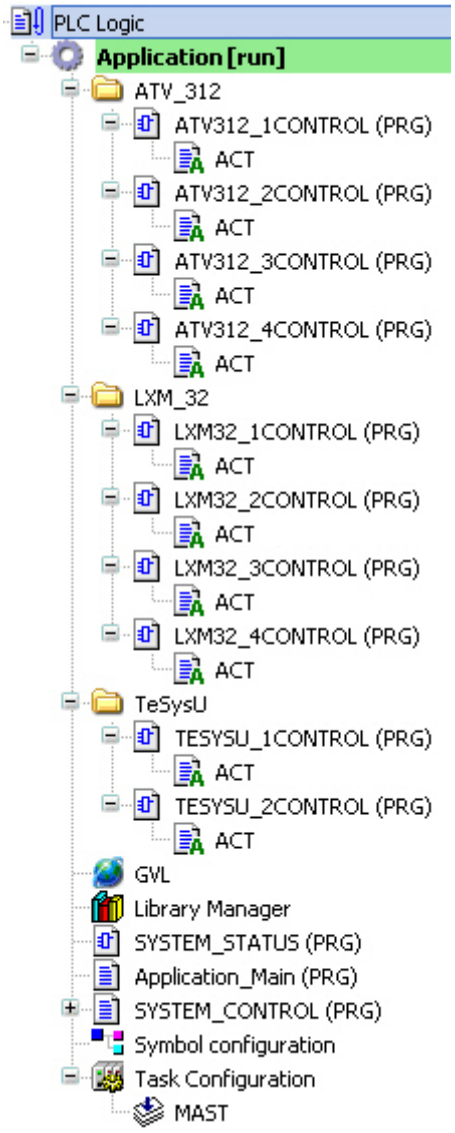
Login to Controller

1	To login to the Controller click **Online** → **Login**	
2	If the Controller program is different from the program on the PC a message asks you how you wish to log in. - **Login with online change** Only the changes are downloaded - **Login with download** The complete Controller-changes are downloaded Select **Login with online change** and click **OK**. If you do not wish to replace the Controller program, select **Login without any change** click **OK** and continue with step 6.	

3	The actual download status is displayed at the bottom of the main window.	
4	With **Online →** **Create boot application** It is possible to create a boot project if you wish. A boot project is stored in EPROM so that a power loss does not mean you have to repeat the download on re-start.	
5	The actual creation status is displayed at the bottom of the main window	
6	To start the new Application select: **Online →** **Start**	
7	To start the new Application confirms the message with a click on **Yes**.	

8	If everything is operational, the devices and folders are marked in green otherwise they will be marked in red.	

Application overview

1	The picture on the right shows the structure of the program.	

HMI

Introduction

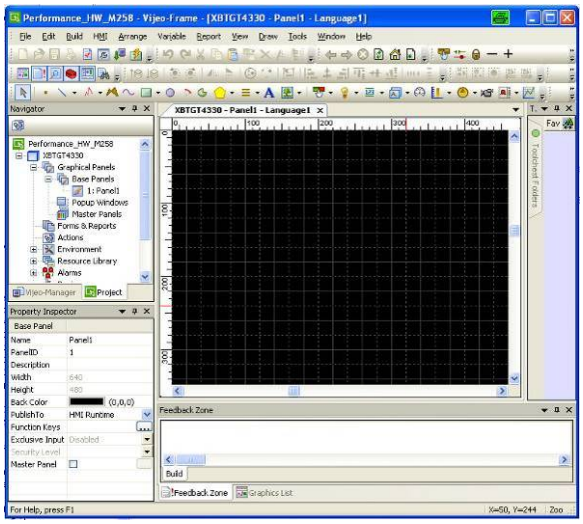
This application uses a Magelis XBTGT4330 HMI. This HMI device communicates with the Controller using the SoMachine protocol on Ethernet. The HMI is programmed using the software tool *Vijeo Designer* (Delivered with SoMachine), described briefly in the following pages. For the connection between the the HMI and the Controller use the **Ethernet cable 490NTW00005.**

NOTE:
The Vijeo Designer tool is opened and closed via SoMachine software. For more information see the chapter
Controller: Add Vijeo Designer HMI

Setting up the HMI is done as follows:

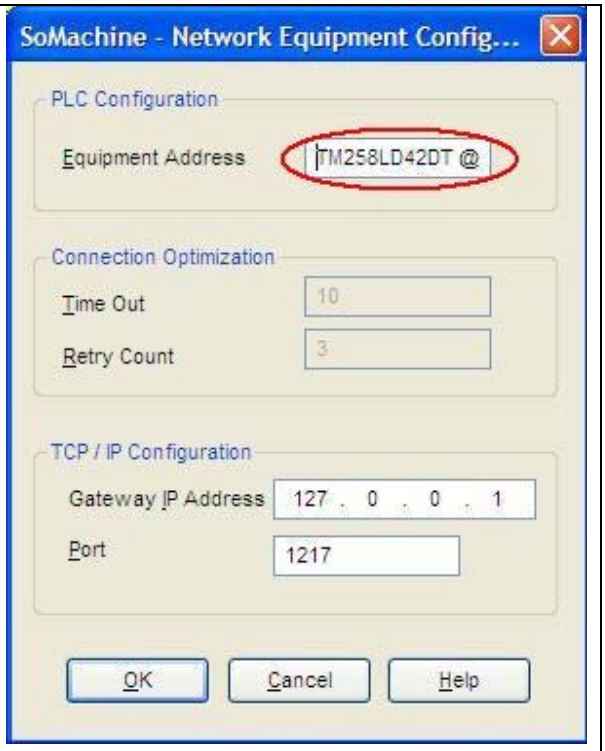
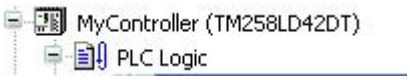
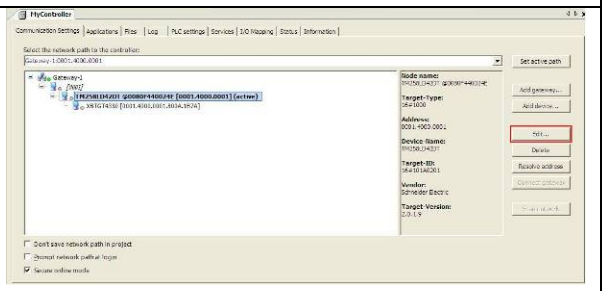
- Main Window
- Communication settings
- Create a switch
- Create a numeric display
- Example screens

Main Window

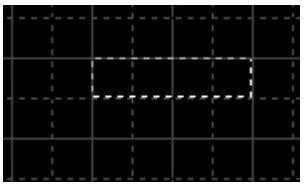
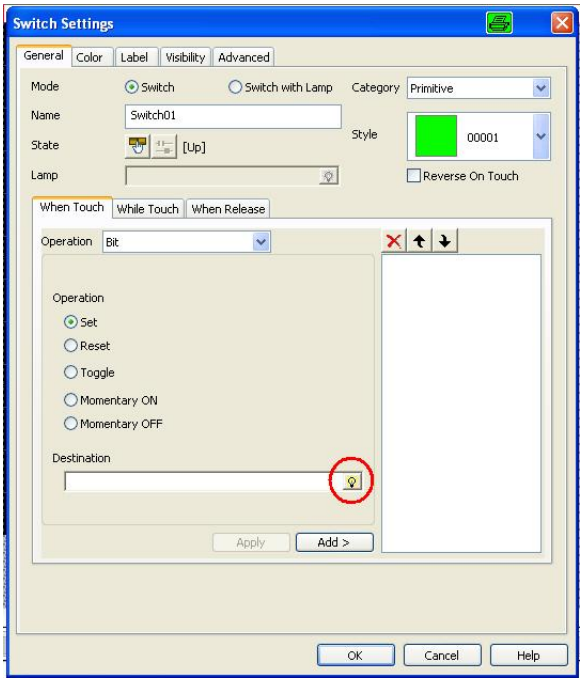
1	After double clicking on HMI application in SoMachine, Vijeo Designer creates the HMI program main window.	

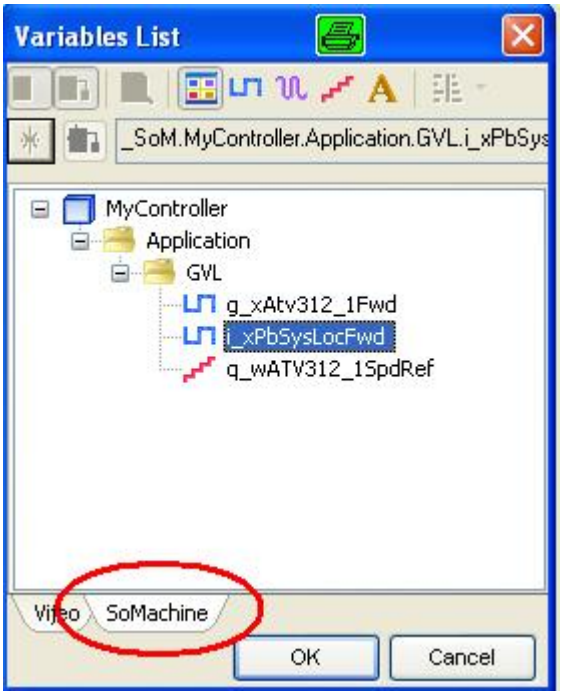
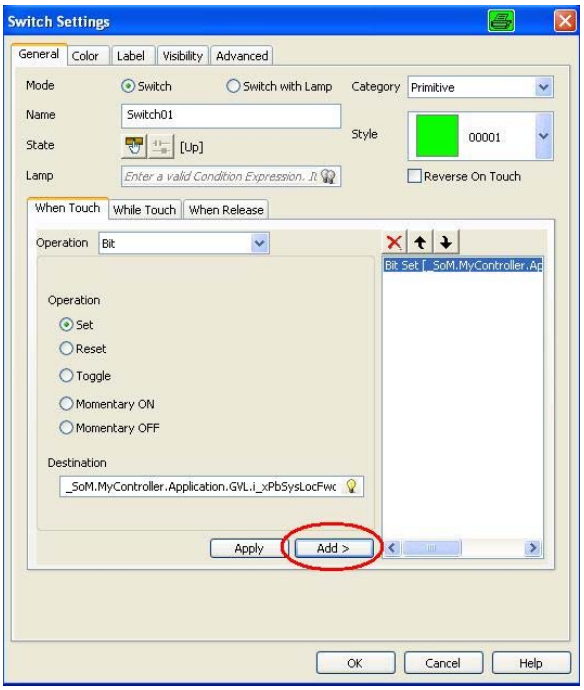
Communi-cation settings

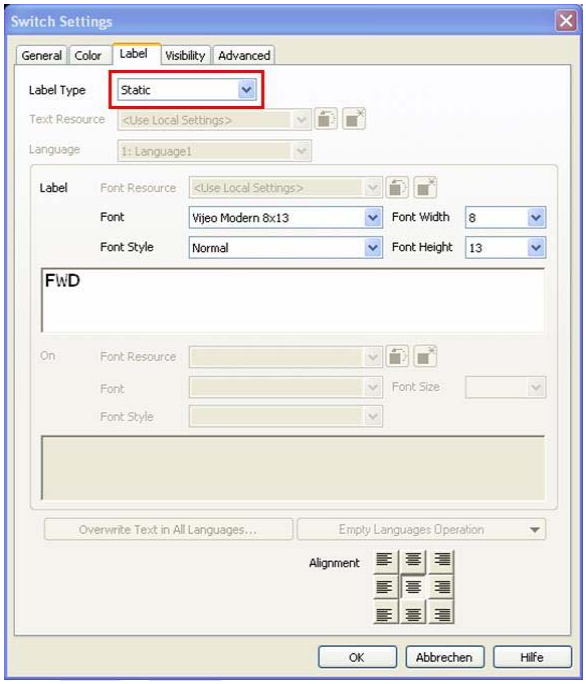
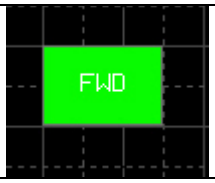
1	To set the communication parameters select in the navigator select: **IO Manager →** **SoMachineNetwork01 →** double click on **SOM_MyController**	

2	In the **SoMachine – Network Equipment Config…** dialog set the Controller **Equipment Address.** You will find this address in SoMachine…	
3	… by double clicking the **MyController** in the SoMachine project browser.	
4	In the **Communication Settings** tab select the Controller and click on **Edit…**	
5	The equipment address of the controller is displayed as the **Device Name**.	

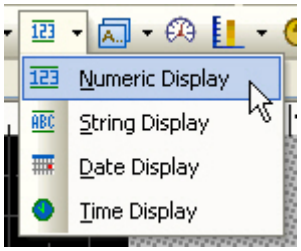
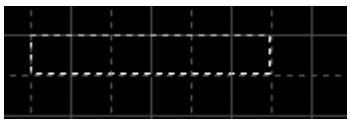
Create a switch

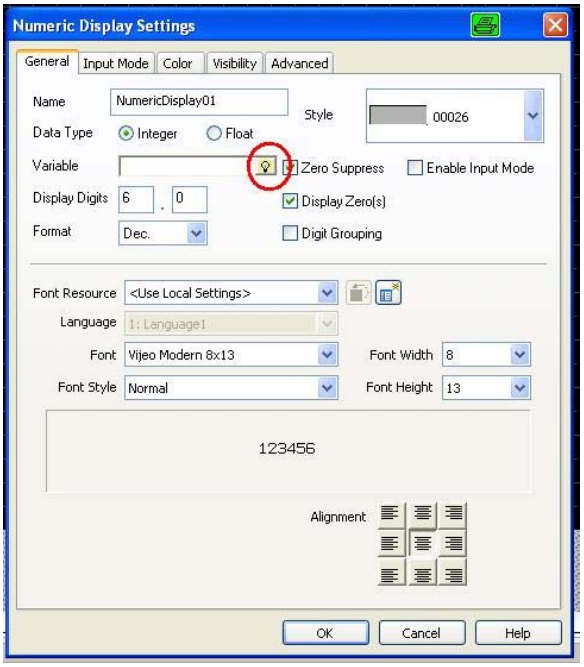
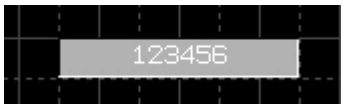
1	Select the **Switch** icon in the **Tool bar**	
2	Select the position where you wish to place the button by opening a rectangle on the display and pressing Enter.	
3	In the **Switch Settings** dialog, under the **General** tab, click on the bulb icon at the end of the **Destination** field to select the variable that should be linked to the switch.	

4	Click on the bulb icon (as indicated in the image above) to open the **Variables List** dialog. Select the **SoMachine** tab and the required variable. (e.g. i_xPbSysLocFwd) Click **OK.**	
5	After the variable has been selected as the switch's **Destination**, click on **Add >**.	

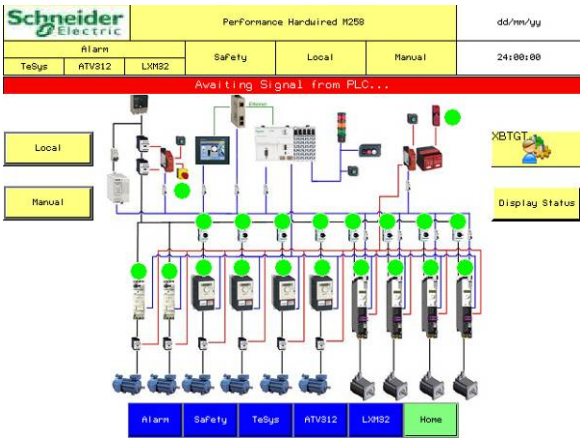
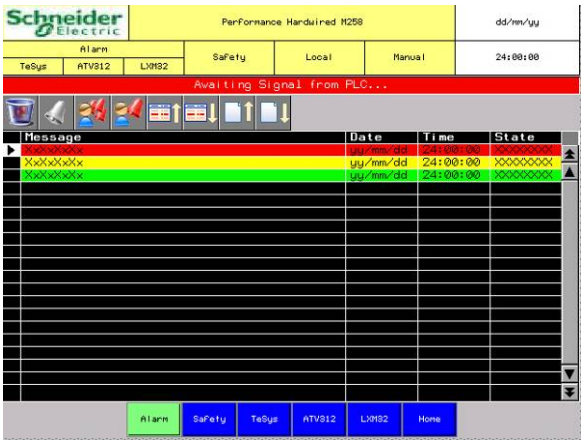
6	In the tab **Label,** select **Static** as the **Label Type** and enter a name that the switch would be labeled with, e.g. FWD. If you wish, you can modify the label's Font attributes (Style, Width, Height and Alignment). When you are satisfied with the switch settings, click on **OK**.	
7	The new switch in now on the Work frame.	

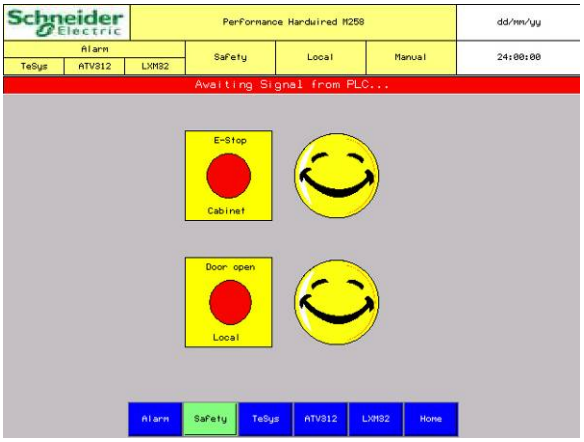
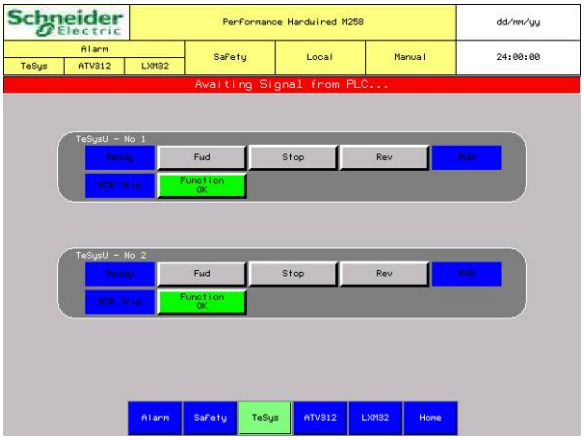
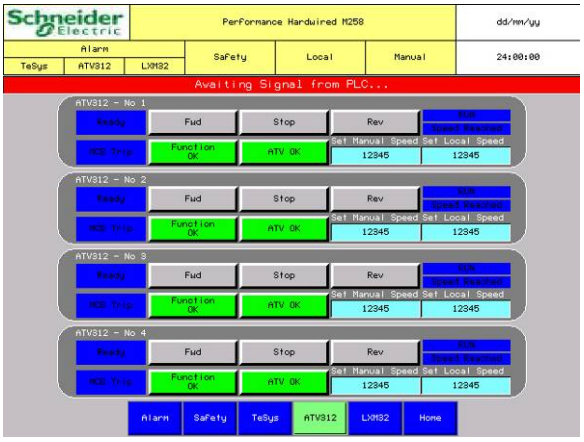
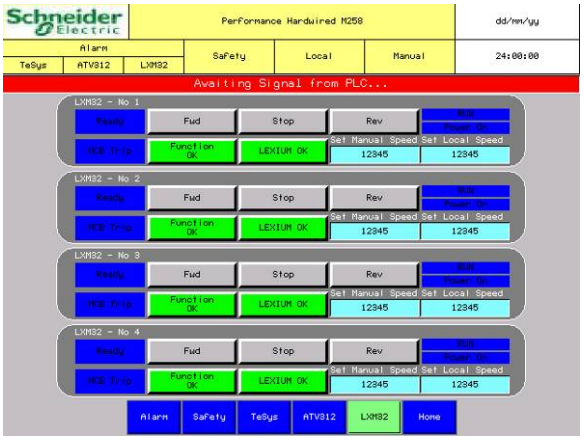
Create a Numeric Display

1	Click on the **Numeric Display** icon in the tool bar.	
2	Click on the panel where you wish to position the numeric display and then drag the cursor to size it. Then click again or press enter.	

3	In the **Numeric Display Settings** dialog, under the tab **General**, click on the bulb icon at the **Variable** field to select the variable that should be linked to the display. In **Display Digits**, the maximum number of digits to be displayed for the integral and fractional part of the value can be set. Click **OK**.	
4	The display shows the new numeric display.	

Example screens

1	The **Home** page shows the architecture.	
2	From the **Alarm** page, it is possible to locate device faults and functional safety problems.	

3	From the **"Safety"** page, it is possible to locate functional safety problems.	
4	From the **TeSys** page, it is possible to control the two TeSys devices.	
5	From the **ATV312** page, it is possible to control the Altivar 312 drives.	
6	From the **LXM32** page, it is possible to control the Lexium 32C servo drives.	

Devices

Introduction	This chapter describes the steps required to initialize and configure the different devices required to attain the described system function.
General	Altivar 312 and Lexium 32C drives are configured by using the local control panel.
Note	It is recommended that the controller is in stop mode before parameterizing the drives.

Altivar 312

Introduction

The ATV312 parameters can be entered or modified via the local control panel on the front of the device.

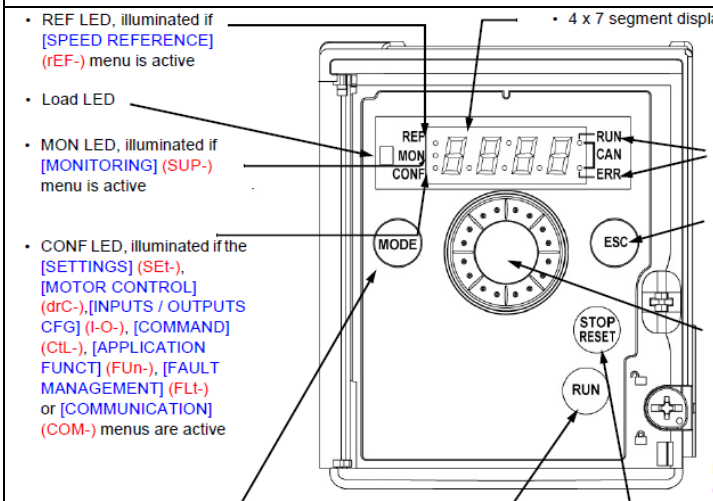
Note

If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please read the drive documentation.

Jog dial that is a part of the local control panel and can be used for navigation by turning it clockwise or counter-clockwise. Pressing the jog dial enables the user to make a selection or confirm information.

Control panel

1	The configuration of the Altivar can be done by using the buttons and the jog dial on the control panel of the Altivar.



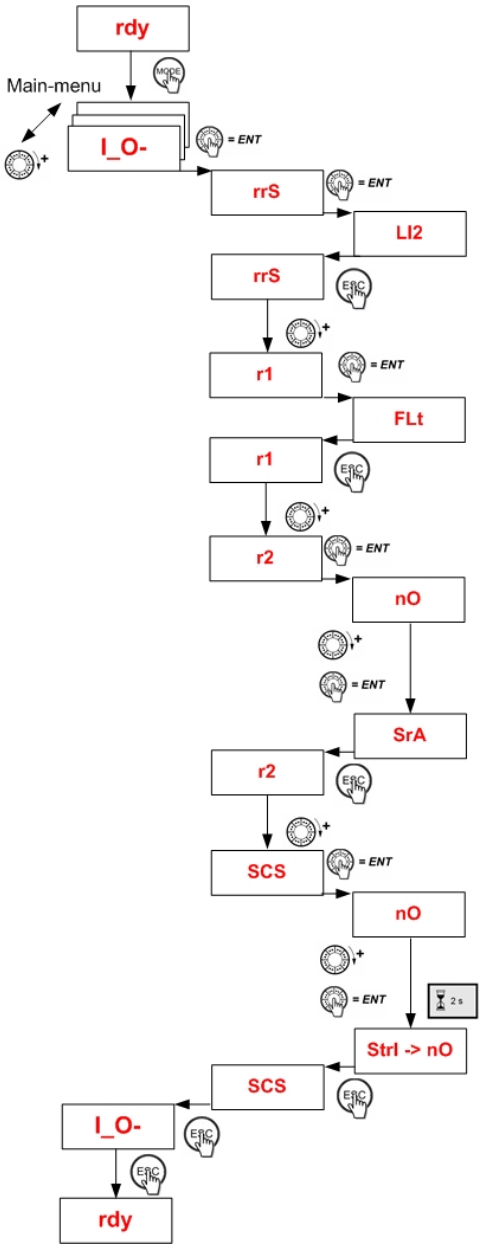
- REF LED, illuminated if [SPEED REFERENCE] (rEF-) menu is active
- Load LED
- MON LED, illuminated if [MONITORING] (SUP-) menu is active
- CONF LED, illuminated if the [SETTINGS] (SEt-), [MOTOR CONTROL] (drC-),[INPUTS / OUTPUTS CFG] (I-O-), [COMMAND] (CtL-), [APPLICATION FUNCT] (FUn-), [FAULT MANAGEMENT] (FLt-) or [COMMUNICATION] (COM-) menus are active
- MODE button (1): If [SPEED REFERENCE] (rEF-) is displayed, this will take you to the [SETTINGS] (SEt-) menu. If not, it will take you to the [SPEED REFERENCE] (rEF-) menu.
- 4 x 7 segment display
- 2 CANopen status LEDs
- Used to quit a menu or parameter or to clear the value displayed in order to revert to the value in the memory
- Jog dial - can be used for navigation by turning it clockwise or counter-clockwise - pressing the jog dial enables the user to make a selection or confirm information. = *ENT*

Functions as a potentiometer if [Ref.1 channel] (Fr1-) in the [COMMAND] (CtL-) menu is set to [Image input AIV1] (AIV1)

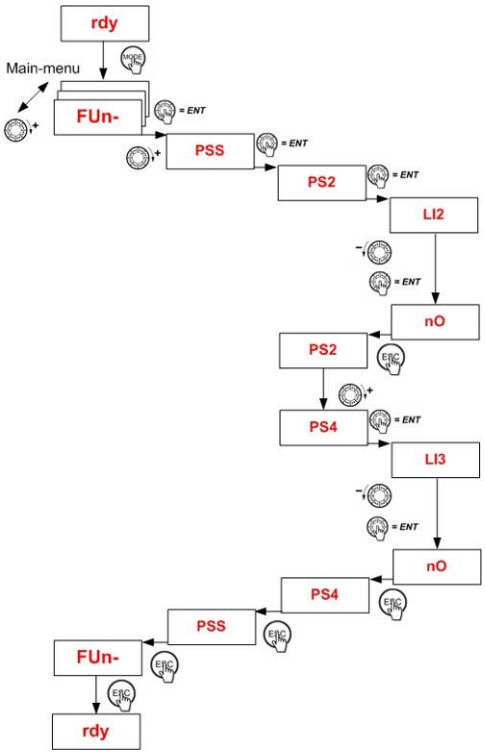
- RUN button: Controls powering up of the motor for forward running if the [2/3 wire control] (tCC) parameter in the [INPUTS / OUTPUTS CFG] (I-O-) menu is set to [Local] (LOC), page 45

STOP/RESET button
- Enables detected fault to be reset
- Can be used to control motor stopping
  - If [2/3 wire control] (tCC) is not set to [Local] (LOC), freewheel stop
  - If [2/3 wire control] (tCC) is set to [Local] (LOC), stop on ramp or freewheel stop during DC injection braking

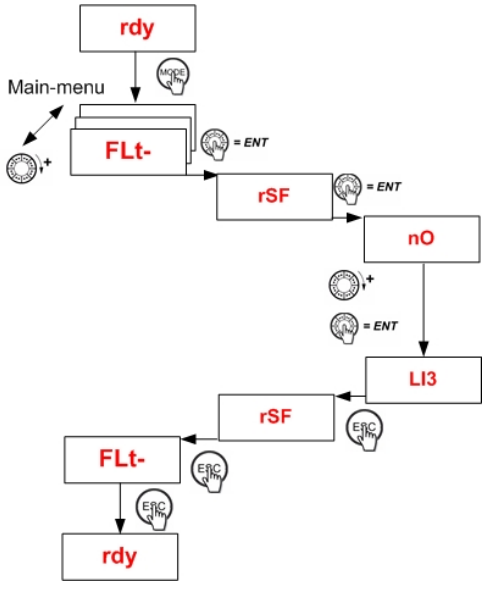
Inputs / Outputs configuration

1	To assign the inputs and outputs: ➔ Press **MODE** ➔ Select **I_O-** [INPUTS / OUTPUTS CFG] and press enter ➔ Select **rrS** (Reverse input assignment) and press enter ➔ The actual value **LI2** (factory setting) ➔ Return to **rrS** with **ESC** ➔ Select **r1** (relay output 1) and press enter ➔ The actual value **FLt** (No Drive Fault, factory setting) ➔ Return to **r1** with **ESC** ➔ Select **r2** (relay output 2) and press enter. The actual value **nO** is displayed. ➔ Select **SrA** (Speed Reached) and press enter ➔ Return to **r2** with **ESC** ➔ Select **SCS** (Save configuration) and press enter. The actual value **nO** is displayed. ➔ Select **Strl** and press enter for 2 seconds ➔ **SCS** automatically switches to **nO** as soon as the as the save has been performed. ➔ Return to **SCS** with **ESC** ➔ Return to **I_O-** with **ESC** ➔ Return to **rdy** with **ESC**	

Change settings for Preset Speeds

1	To assign the settings for Preset Speeds: ➔ Press **MODE** ➔ Select **FUn-** [APPLICATION FUNCT.] and press enter ➔ Select **PSS** and press enter ➔ Select **PS2** and press enter. The actual value **LI2** is displayed. ➔ Select **nO** and press enter ➔ Return to **PS2** with **ESC** ➔ Select **PS4** and press enter. The actual value **LI3** is displayed. ➔ Select **nO** and press enter ➔ Return to **PS4** with **ESC** ➔ Return to **PSS** with **ESC** ➔ Return to **FUn-** with **ESC** ➔ Return to **rdy** with **ESC** The reason for this modification is: in this Application we do not use the Preset Speeds and we use the Input LI3 for **rSF** (Fault Reset)	

Fault management

1	To assign the settings for Fault management: ➔ Press **MODE** ➔ Select **FLt-** [FAULT-MANAGEMENT] and press enter ➔ Select **rSF** (Reset Fault) and press enter. The actual value **nO** is displayed. ➔ Select **LI3** and press enter ➔ Return to **rSF** with **ESC** ➔ Return to **FLt-** with **ESC** ➔ Return to **rdy** with **ESC**	

Lexium 32C

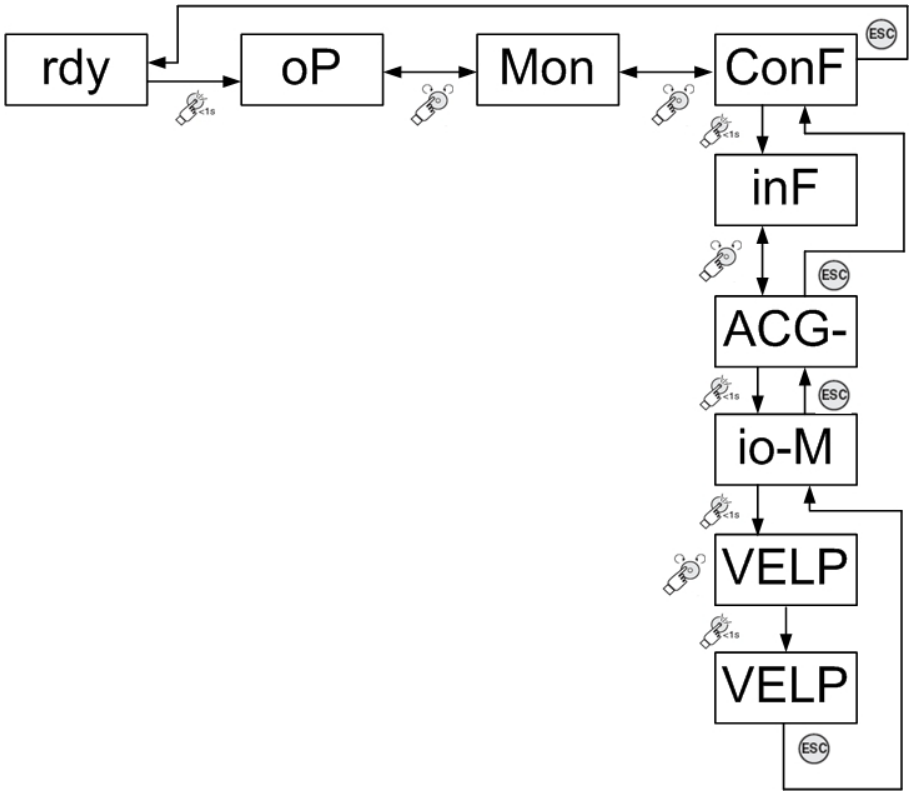
Introduction

The LXM32C parameters can be entered or modified via using the local control panel on the front of the device.

Note:
If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please refer to the drive documentation.
If the drive is being started for the first time, the **FSu** (First Setup) is invoked.

Select the operating mode

1	Selection of the operating mode: **VELP** (Profile Velocity). The parameter “IOdefaultMode” (**io-M**) is used to set the desired operating mode. The selected operating mode is starting by enabling the power stage. ► Set the operating mode with the parameter “IOdefaultMode” (**io-M**).



Parameter name HMI menu HMI name	Description
IOdefaultMode ConF → ACG- , o-M	Operating mode 0 / None / nonE: None **1 / Profile Torque / tor9**: Profile Torque **2 / Profile Velocity / UELP**: Profile Velocity **3 / Electronic Gear / GEAr**: Electronic Gear **5 / Jog /** JoG: Jog Setting can only be changed if power stage is disabled. Changed settings become active the next time the product is switched on.

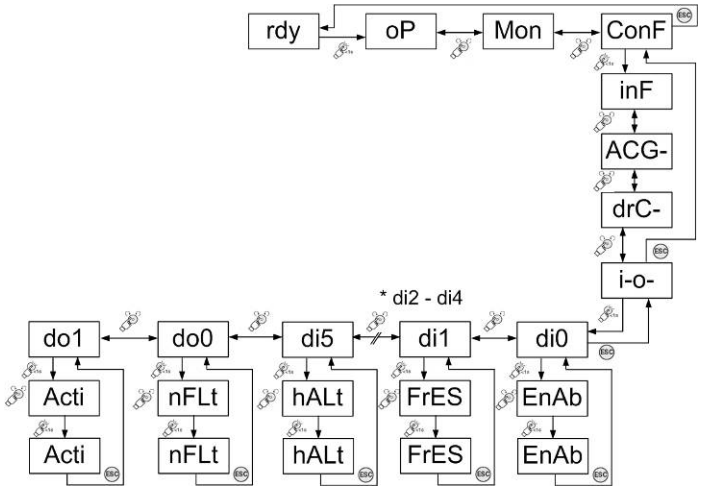
Inputs / Outputs configuration

1

Configuration of the digital inputs **di0, di1, di5** and digital outputs **do0, do1**.

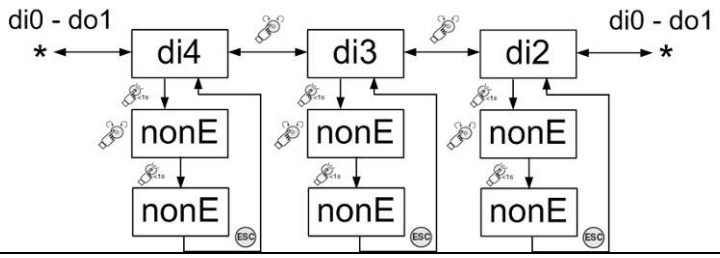
► **di0** → **EnAb** Enables the power stage
► **di1** → **FrES** Fault reset after error
► **di5** → **hALt** Stopping movement with Halt
► **do0** → **nFLt** Ready to switch on
► **do1** → **Acti** Operation Enable

The digital inputs **di2 – di5** are not used. It is required to set this inputs to **nonE**.
► **di2** → **nonE**
► **di3** → **nonE**
► **di4** → **nonE**
► **di5** → **nonE**



Parameter name HMI menu HMI name	Description
IOfunct_DI0 ConF → i-o- di0	Function Input DI0 1 / Freely Available / nonE: Available as required **2 / Fault Reset /** FrES: Fault reset after error **3 / Enable /** EnAb: Enables the power stage

Parameter name HMI menu HMI name	Description
IOfunct_DQ0 ConF → i-o- do0	Function Output DQ0 1 / Freely Available / nonE: Available as required **2 / No Fault /** nFLt: Signals operating states Ready To Switch On, Switched On and Operation Enable **3 / Active /** Act: Signals operating state Operation Enable



Power cycle

1	In case of display **“nrdy”** instead of **“rdy”**, a power cycle (on, off, on) is required.

Appendix

Detailed Component List

The following order list is the list of main parts for the Performance HW M258. The complete order and component list of the build up overall architecture is in the EPLAN file “Performance_HW_M258_WID”

Sarel cabinet

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
1.0	1	Cabinet with mounting plate 1800 x 1000 x 600 mm (HxWxD)	NSYSF181060P	
1.1	1	Set of Side wall 1800 x 600 mm	NSY2SP186	
1.2	1	Wiring diagram pocket	NSYDPA4	
1.3	1	Fan with filter, 250 m³, 230 V, IP54	NSYCVF165M230PF	
1.4	1	Cabinet filter 223 x 223	NSYCAG223LPF	
1.5	1	Cabinet light incl. socket, magnetic fixing	NSYLAM75	
1.6	1	Thermostat 1NC, 0-60 °C	NSYCCOTHO	

Main switch

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
2.0	1	Main switch 3pin 36 kA	LV429003	
2.1	1	Contact block TM32D	LV429035	
2.2	1	Terminal cover	LV429515	
2.3	1	Rotary drive with door interface	LV429340	

Power supply

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
3.0	4	Power supply 230 Vac / 24 Vdc, 5 A	ABL8RPS24050	
3.1	4	Disconnect terminal	5711016550	
3.2	4	Fuse 6.3 A, Type T slow-blow (third party)	021806.3HXP (Littelfuse)	
3.3	2	Fuse 3.15 A, Type T, slow-blow (third party)	02183.15HXP (Littelfuse)	
3.4	4	Fuse 1 A, Type T , slow-blow (third party)	0218001.HXP (Littelfuse)	
3.5	5	Terminal for Fuse with LED	AB1FUSE435U5XB	
3.6	8	Circuit Breaker C60N 1P, C, 2 A	23726	
3.7	4	Circuit Breaker C60N 2P, C, 2 A	24443	
3.8	1	Circuit Breaker C60N 1P, C, 3 A	23728	
3.9	1	Circuit Breaker C60N 2P, C, 2 A	23747	
3.10	2	Circuit Breaker C60N 1P, C, 10 A	25397	
3.11	1	Circuit Breaker C60N 2P, C, 10 A	23756	

M258

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
4.0	1	Modicon M258 Logic Controller	TM258LD42DT	V2.0
4.1	1	Pt100 input module 4 IN	TM5SAI4PH	
4.2	1	Analog input module 4 IN	TM5SAI4L	
4.3	2	Analog output module 4 OUT	TM5SAO4L	
4.4	3	Digital input module 12 IN	TM5SDI12D	
4.5	1	Digital input module 6 IN	TM5SDI6D	
4.6	3	Digital output module 12 OUT	TM5SDO12T	
4.7	1	Power supply module 24 Vdc	TM5SPS1	
4.8	1	Base module for power supply	TM5ACBM01R	
4.9	11	Base module for expansion slices	TM5ACBM11	
4.10	1	Locking plate right	TM5ACLPR1	
4.11	12	Terminal block, 12 pin coded	TM5ACTB12	

Drives

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
5.0	4	ATV 312 variable speed drives 0.37 kW	ATV312H037N4	V 5.1 IE50
5.1	4	Lexium 32C servo drives 0.75 kW	LXM32CD18M2	V 01. 03.14
5.2	4	Servo motor	BMH0702T06A2A	
5.3	2	TeSysU base module reversing 12 A	LU2B12BL	
5.4	2	TeSysU coil wiring kit	LU2MB0BL	
5.5	2	TeSysU standard control unit	LUCA05BL	
5.6	2	TeSysU Auxiliary contact module (NC, Fault)	LUA1C11	
5.7	2	TeSysU Function Module 2 NO	LUFN20	
5.8	4	Magnetic circuit breaker 2.5 A	GV2L07	
5.9	4	Magnetic circuit breaker 10 A	GV2L14	
5.10	8	Auxiliary contacts for circuit breaker 1NO 1 NC	GVAE11	
5.11	4	Power cable for Lexium 32, 5 m	VW3M5101R50	
5.12	4	Encoder cable for Lexium 32, 5 m	VW3M8102R50	

HMI

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
6.0	1	Magelis XBTGT 7.4“ touch display	XBTGT4330	V5.1. 19.0

Communication

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
7.0	1	Ethernet switch 3 port	TCSESU033FN0	
7.1	2	Patch cable twisted pair RJ45, 2 m	490NTW00002	

E-Stop and Door Guard

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
8.0	1	E Stop safety module XPSAV	XPSAV11113Z002	
8.1	1	Safety extension module	XPSECP5131	
8.2	1	Door guarding module XPSAC	XPSAC5121	
8.3	1	Emergency Stop pushbutton for cabinet door	XB5AS844	
8.4	1	Auxiliary contacts for cabinet E-Stop	ZB5AZ141	
8.5	3	Illuminated pushbutton, 1 NC, blue	XB5AW36B5	
8.6	2	Assembly housing	XALD01	
8.7	1	Door guard switch	XCSPA792	
8.8	1	Actuator for door guard switch	XCSZ12	
8.9	8	E-Stop / Door guarding contactors 2.4 kW	LC1D09BL	

Harmony

Hardware-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
9.0	1	Box for 3 button / Assembly housing	XALD03	
9.1	1	Assembly housing	XALD01	
9.2	1	Signal lamp LED white	XB5AVB1	
9.3	2	Illuminated pushbutton, green	ZB5AW333	
9.4	2	LED module green, for pushbutton	ZALVB3	
9.5	1	Pushbutton, red	ZB5AA41	
9.6	3	Auxiliary switch bank	ZENL1111	
9.7	1	Auxiliary contact 1NO/NC	ZB5AZ105	
9.8	3	Labels for engraving	ZBY0101	
9.9	1	Tag holder 30 X 50 mm	ZBZ33	
9.10	3	Tag holder 30 X 40 mm	ZBZ34	
9.11	1	Signal Pillar Pipe	XVBC02	
9.12	1	Connection element	XVBC11	
9.13	1	Terminal	XVBC21	
9.14	1	Signal element green	XVBC2B3	
9.15	1	Signal element red	XVBC2B4	
9.16	1	Signal element blue	XVBC2B6	
9.17	1	Signal element white	XVBC2B7	

Software Tools

Software-Components				
Pos.	**Qty.**	**Description**	**Part Number**	**Rev./ Vers.**
10.0	1	SoMachine V 2.0	MSDCHNSFUV20	V 2.0
10.1	1	Programming cable (USB)	TCSXCNAMUM3P	

Component Protection Classes

Positioning Protection Class	Component	In Field, On Site			Cabinet		
					Front		Inside
		IP54	IP65	IP67	IP55	IP65	IP20
	Main switch, with or without undervoltage protection and integrated indicator						**X**
	Preventa relays XPS						**X**
	Single/Double switch housing, complete		**X**				
	Indicator buttons,		**X**				
	Buttons with LED + 1 switch(1S)						**X**
	Labels 30x40, 30x50		**X**				
	Phaseo Power Supply						**X**
	Modicon M258 Logic controller						**X**
	Altivar 312						**X**
	Lexium 32C servo drive						**X**
	BSH Servo motor		**X** shaft end IP40				
	TeSys contactor						**X**
	Magelis HMI XBTGT					**X**	**X**

Component Features

Components

Compact NSX main switch

Compact NSX disconnector from 12 to 175 A are suitable for on-load making and breaking of resistive or mixed resistive and inductive circuits where frequent operation is required. They can also be used for direct switching of motors in utilization categories AC-3 and DC-3 specific to motors.

- 3-pole rotary switch disconnector, 12 to 175 A
- Pad lockable operating handle (padlocks not supplied)
- Degree of protection IP65

Power Supply Phaseo: ABL8RPS24050

- 1 or 2-phase connection
- 100...120 Vac and 200...500 Vac input
- 24 Vdc output
- 5 A output
- Diagnostic relay
- Protected against overload and short circuits

Preventa safety module: XPSAC5121

Main technical characteristics:

For monitoring	Emergency Stop
Max. Category accord. EN 954-1	3
No. of safety circuits	3 N/O
No. of additional circuits	1 Solid-State
Indicators	2 LED
Power supply AC/DC	24 V
Response time on input opening	< 100 ms
AC-15 breaking capacity	C300
DC-13 breaking capacity	24 Vdc / 2 A - L/R 50ms
Minimum voltage and current	17 V / 10 mA
Dimensions (mm)	114 x 22.5 x 99
Connection	Captive screw-clamp terminals
Degree of protection	IP20 (terminals) IP40 (casing)

Safety modules XPSAC are used for monitoring Emergency Stop circuits conforming to standards EN ISO 13850 and EN 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088 ; ISO 14119. They provide protection for both the machine operator and the machine by immediately stopping the dangerous movement on receipt of a stop instruction from the operator, or on detection of a fault in the safety circuit itself.

Modicon M258 Logic controller:
TM258LD24DT

The M258 is powered with 24 Vdc, offer:

- 26 x 24 Vdc inputs including 10 fast inputs, dedicated to special functions such as HSC high-speed counting
- 16 x 24 Vdc solid state outputs including 4 fast outputs, dedicated to special functions such as counting, PWM and PTO
- USB-B mini-port: Programming port for SoMachine V2.0 Software
- USB-A-port: Connection of a USB memory stick for tranferring programs, data files, firmware updates
- RJ45-port (MBS): RS 485 serial link mainly dedicated to connection of a Human/Machine interface terminal (link providing a 5 V power supply for a Magelis Panel)
- SUB-D connector (male9-way/CAN0)): Master CANopen bus
- RJ45-port (Ethernet): Ethernet TCP IP, Web Server, Ethernet Modbus TCP

Magelis Display Terminal: XBTGT4330

- Sensor screen (STN-Technology) with 24 Vdc power supply
- Brightness and Contrast adjustment
- Communication via Uni-Telway and Modbus. Communication via Ethernet TCP/IP le in specific models
- Flat Profile
- Memory expansion for application program
- Temperature range: 0..+ 50 °C
- Certificates: UL, CSA

TeSysU motor starter

One power base
Control unit 0.15 to 32 A
- Only 6 setting ranges up to 32 A
- Only 4 voltage ranges up to 240 Vac/dc
- 3 versions: Standard, Extended, Multifunctional

Overall width 45 mm
Complete reversing contactor combination 0.15 to 32 A
Auxiliary switches and function modules
- Integrated: Motor circuit breaker auxiliary contact 1 NC, with connectors
- Integrated: Contactor auxiliary contacts 1 NO + 1 NC, freely available
- Option: Auxiliary switch module with 2 contactor state contacts
- Option: “Error” and “Selector switch position” signal contact
- Alarm – thermal overload function module
- Motor load display function module (0 to 10 V, 4 to 20 mA)
- Differentiated error display function module (under development)

Communication modules
- Parallel wiring; with plug-in connection cables up to eight motor controls can be supplied on one distribution module
- Modbus RTU protocol
- AS-Interface
- CANopen
- Gateway: FIPIO/Modbus, DeviceNet/Modbus, Profibus DP/Modbus

Lexium 32 servo drive

- Voltage range:
  1-phase 100 – 120 Vac or 200 – 240 Vac
  3-phase 200 – 240 Vac or 380 – 480 Vac
- Power: 0.4 to 6 kW
- Rated torque: 0.5 to 36 Nm
- Rated speed: 1500 to 8000 RPM
- The compact design allows for space-saving installation of the drive in control cabinets or machines.
- Features the "Power Removal" (Safe Stop) functional safety function, which prevents the motor from being started accidentally. Category 3 with machine standard EN 954-1
- Lexium 32 servo amplifiers are fitted with a brake resistor as standard (an external brake resistor is optional)
- Quick control loop scan time: 62.5 µs for current control loop, 250 µs for speed control loop and 250 µs for position control loop
- Operating modes: Point-to-point positioning (relative and absolute), electronic gears, speed profile, speed control and manual operation for straightforward setup.
- Control interfaces:
  CANopen, Modbus or Profibus DP
  Analog reference inputs with ± 10 V
  Logic inputs and outputs

Altivar 312 Variable Speed Drive

The Altivar 312 varisble speed drive for 3-phase squirrel cage asynchronous motors. The Altivar 312 is robust, compact, easy to use and conforms to EN 50190, IEC/EN 61800-2, IEC/EN 61800-3 standards UL/CSA certification and to CE marking.

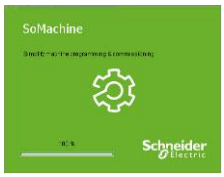
Altivar 312 drives communicate on Modbus and CANopen industrial buses. These two protocols are integrated as standard.

Altivar 312 drives are supplied with a heat sink for normal environments and ventilated enclosures. Multiple units can be mounted side by side to save space.

Drives are available for motor ratings between 0.18 kW and 15 kW, with four types of power supply:

- 200 Vac to 240 Vac 1-phase, 0.18 kW to 2.2 kW
- 200 Vac to 240 Vac 3-phase, 0.18 kW to 15 kW
- 380 Vac to 500 Vac 3-phase, 0.37 kW to 15 kW
- 525 Vac to 600 Vac 3-phase, 0.75 kW to 15 kW

SoMachine OEM Machine Programming Software: MSDCHNSFUV20



SoMachine is the OEM solution software for developing, configuring and commissioning the entire machine in a single software environment, including logic, motion control, HMI and related network automation functions.

SoMachine allows you to program and commission all the elements in Schneider Electric's Flexible and Scalable Control platform, the comprehensive solution-oriented offer for OEMs, which helps you achieve the most optimized control solution for each machine's requirements.

Flexible and Scalable Control platforms include:

Controllers:

HMI controllers:
- Magelis XBTGC HMI controller
- Magelis XBTGT HMI controller
- Magelis XBTGK HMI controller

Logic controllers:
- Modicon M238 Logic controller
- Modicon M258 Logic controller

Motion controller
- Modicon LMC058 Motion controller

Drive controller:
- Altivar ATV-IMC Drive controller

HMI:

HMI Magelis graphic panels:
- XBTGT
- XBTGK

SoMachine is a professional, efficient, and open software solution integrating Vijeo Designer.
It integrates also the configuring and commissioning tool for motion control devices.

It features all IEC 61131-3 languages, integrated field bus configurators, expert diagnostics and debugging, as well as outstanding capabilities for maintenance and visualization.

SoMachine integrates tested, validated, documented and supported expert application libraries dedicated to Packaging, Hoisting and Conveying applications.

SoMachine provides you:
- One software package
- One project file
- One cable connection
- One download operation

Contact

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